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REPORT

ON A

GEODETIC SURVEY

FOR

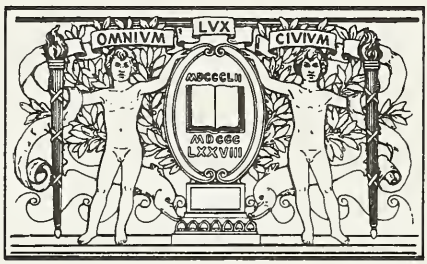
BOSTON

1938-1941

W. P. A. PROJECT NUMBERS

65-14-5744
665-14-3-952
165-1-14-259

THE CITY PLANNING BOARD
BOSTON, MASSACHUSETTS



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Supervising Engineer - Thomas E. McCormick

REPORT NO. 1 — TRIANGULATION

THE CITY PLANNING BOARD
BOSTON, MASSACHUSETTS

NOVEMBER, 1942

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OFFICE OF
THE CITY PLANNING BOARD
43 City Hall
BOSTON, MASS.

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Honorary Consultant

BOSTON, October 8, 1942.

HON. MAURICE J. TOBIN,
Mayor of the City of Boston.

DEAR MAYOR TOBIN,— The City Planning Board presents herewith its seventh published report on the result of activities made possible through the allocation of Federal relief funds. Whereas the preceding reports dealt with the collection, tabulation and charting of factual data, for use in city planning studies, the present report pertains to an engineering survey the purpose of which was the making of an Official Map of the city.

The project of which this report is a result was designed to provide employment while yielding constructive results, and was carried on over a period of five and a half years by the Work Projects Administration under the name of the Boston Geodetic Survey. It was at first intended to make only detailed block plans of the city from existing controls but in the interests of accuracy it was found necessary to make an original control survey starting with first-order triangulation.

This report describes only the triangulation portion of the control survey, the completed phase of the work. The unfinished work, of which there is a great deal, has been filed for future use when conditions are such that the work can be revived. The Introduction, immediately following the prefatory statement, contains a more detailed outline of the purposes involved and the procedure followed in connection with the work, along with acknowledgments of material, help and advice received.

The work began under the chairmanship of Frederic H. Fay, whose interest and effort greatly influenced the development of the program. Upon his resignation in 1936, William Stanley Parker became Chairman and gave much of his time in determining matters of policy. Prof. Emil A. Gramstorff, upon becoming a member of the Board in 1939, made several visits to the project and took a continuing interest in the work.

Fifty years ago the Board of Survey mapped a good deal of the city. Much of that work has now been obliterated. The present survey project was an attempt to retrieve and expand that work, using the latest accepted technical methods. It is hoped that the Geodetic Survey Project will be renewed when funds are available, as the value of comprehensive surveys and maps is being increasingly recognized by American city governments.

Very truly yours,

THE CITY PLANNING BOARD.

To the City Planning Board.

I submit herewith a report on the Official Map Survey, most recently called the Boston Geodetic Survey. The survey was a Work Projects Administration project having chronologically Official Project Nos. 65–14–5744, 665–14–3–952 and 165–1–14–259 and the respective State Project Nos. 5349, 18932 and 22324. Inasmuch as the triangulation is the only completed unit of the work, the final results shown in this report have been confined to that phase. The report can thus be considered as Report No. 1 of the Official Map Survey. For the present a short historical sketch of the entire project, describing the status of the unfinished material, is submitted as a final report on the closing of the work as a W. P. A. project on June 30, 1941.

The preliminary draft of the project was drawn up in the summer of 1935 under the arrangement of Miss Elisabeth M. Herlihy, at that time Secretary of the Boston City Planning Board. Work started on December 9, 1935, under the direction and supervision of Mr. Frank H. Malley, then Engineer for the Board.

Upon Miss Herlihy's assuming the chairmanship of the State Planning Board and the subsequent appointment of Mr. Malley to the position of Executive Director of the Department in July, 1936, the management of the project was taken over by the undersigned.

The project encountered many difficulties, some of which were insuperable during its five and a half year life, and, consequently, it accomplished only part of its objectives. The main purpose of the project in the beginning was the making of a cadastral map of the city, using existing control surveys. Before the end of the first year of work it became apparent that nothing of value could be accomplished without starting at the beginning and making an original first-order geodetic survey.

Early in 1937 the project re-oriented itself gradually in this direction, still continuing to do detail map work in order to keep the personnel occupied. The specifications adopted were those laid down in "Technical Procedure for City Surveys," Manual No. 10 of the American Society of Civil Engineers with general reference to the special publications of the United States Coast and Geodetic Survey.

The project was successful in completing the work on a triangulation network over the entire city. The network included five first-order base lines and sixty-five stations, controlling an area of about ninety square miles. Final geographic positions and official Massachusetts Lambert Coordinates were computed. With the exception of the triangulation the work is generally in a state of partial completion.

The field work on three hundred miles of first-order traverse was completed except for some re-observation work. The traverse had an average distribution of six linear miles to the square mile with a pair of monuments from five hundred to one thousand feet apart for each mile of traverse. Out of twenty-two hundred and eighty stations four hundred and seventy-four are monumented, the remainder being of a semi-permanent nature, either iron pipes driven into the ground or

lead plugs placed in sidewalks. Final Lambert Coordinates were completed for the Charlestown and East Boston areas. Though preliminary computations have been made for a large part of the remainder of the city the final computations were not completed.

Field work on supplementary traverse was carried out in East Boston and South Boston. However, the project was unable to complete any work on this phase.

A system of first-order levels was started in 1939. Reconnaissance, the setting of bench marks and some field work, paralleling the first order control traverse, was accomplished over the northern part of the city but work was suspended when the level was withdrawn by the W. P. A. and no final computation was attempted.

Concurrently with the geodetic phase, field work on the property survey, *i. e.*, the location of street lines and building detail, was being carried on. One hundred and seventy-five miles out of a city-wide total of about seven hundred miles, covering the East Boston, South Boston and Dorchester areas, were so located. Records of the work are in the project files.

During the first year of the project the greater part of the funds was spent on the measurement of buildings. This phase was eighty-five per cent completed, the entire area of the city, except for Boston Proper, being covered. Individual sheets showing the plan measurements of all buildings are on file.

The fact must not be lost sight of, that the motivating purpose during the entire life of the project was the social one of putting unemployed men to work. Indeed one of the valuable intangible benefits of the project was the education and training of large numbers of men who were later placed as surveyors on defense work, both governmental and private. The personnel varied from a maximum of five hundred and sixty-one to an average of two hundred men, having some seventeen hundred men on the pay roll at one time or another. Where there was the constant pressure of a great many untrained men being assigned for work and a short weekly work period along with changes in regulations, setting up different work hours for various classifications and the further complication of staggered shifts in the working days, it can be seen that high efficiency in production was difficult to obtain.

The project started operation on December 9, 1935, with an initial appropriation of $982,000 by the Works Progress Administration. Additional funds to the amount of $206,000 were allocated in July, 1939, for a continuation of the work under the renamed Work Projects Administration. On December 16, 1940, a further allotment of $97,000 was made to carry the work through the year 1941. However, on June 30, 1941, due to retrenchment in W. P. A. funds and the dearth of competent men, the project was closed with an unexpended balance of $41,309 in Federal funds. The entire amount expended out of city funds was $40,000. This does not include items charged as sponsor's contribution, such as the rental of equipment and quarters, sponsor's supervision, etc. The total of Federal funds spent amounted to $1,243,642, of which $1,201,817 was for labor costs and $41,825 for material. A large amount of money spent in the first two years of the project was used for training. A great part of the survey and computation work of the first two years had to be redone because of changes

in methods and specifications. Appendix No. 1 contains a table showing the itemized labor costs by phase and by years.

The computations on the final adjustment of the triangulation are in the files of the United States Coast and Geodetic Survey in Washington. The geographic positions have been listed and issued on the data sheets of that department.

Respectfully submitted,

THOMAS E. McCORMICK,
Planning Engineer.

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND NOT THE SIGNER OF THIS LETTER

AND REFER TO NO. 60–MM

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON

August 24, 1942.

MR. WILLIAM STANLEY PARKER,
Chairman, The City Planning Board,
43 City Hall, Boston, Mass.

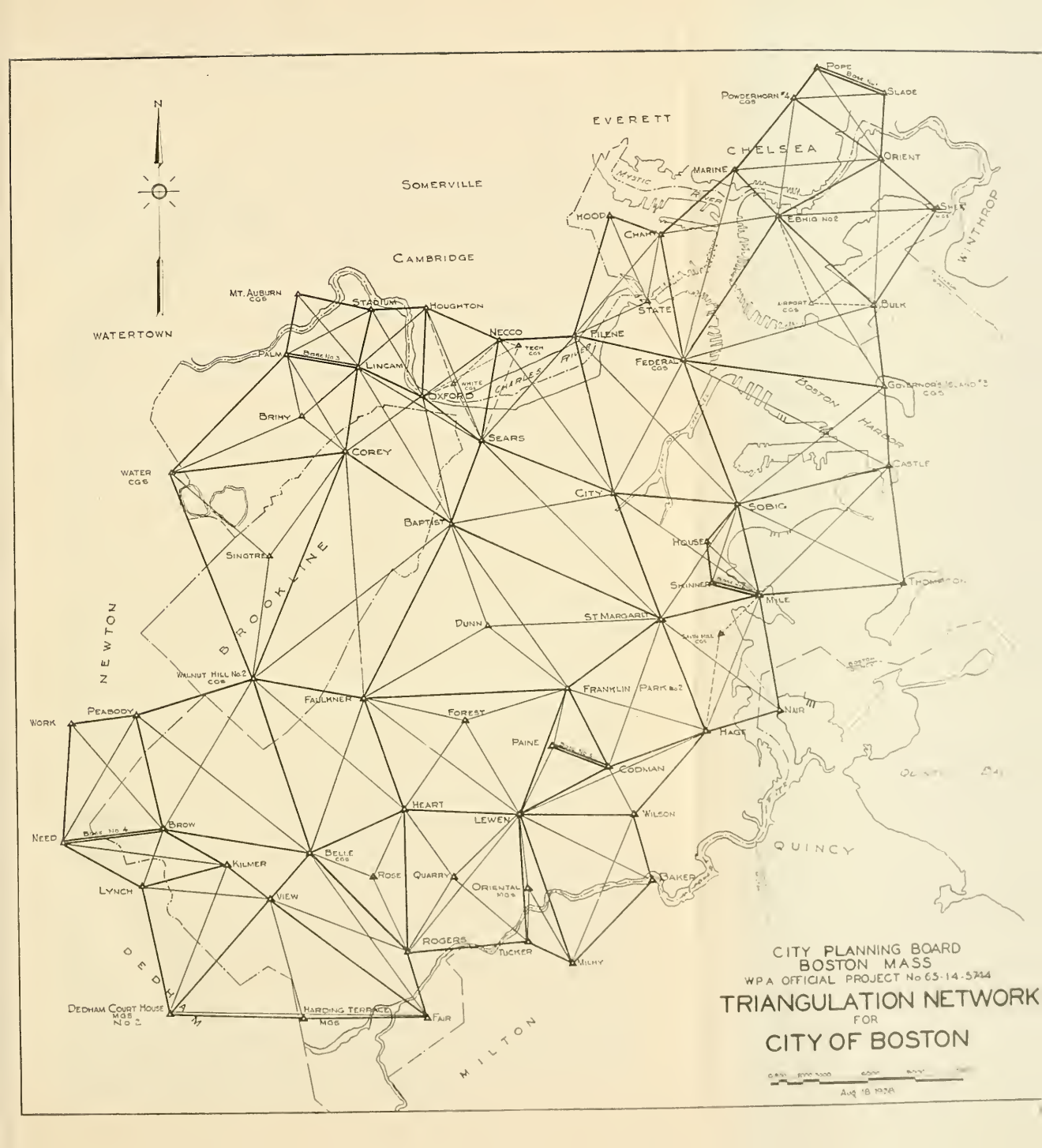
MY DEAR SIR,—I was glad to learn from Mr. Thomas E. McCormick, Planning Engineer of the City Planning Board, that you are planning to publish the results of the triangulation accomplished under the sponsorship of the City Planning Board of Boston.

This material is certain to be of much value to engineers and surveyors who may be engaged in mapping, zoning or planning surveys requiring frequent use of horizontal control data.

It is gratifying to know that this work has been duly coordinated with the Federal control net and forms a valuable local supplement thereto. We hope that you will be able to forward to the Bureau a copy when the material is published.

Very truly yours,

LEO OTIS COLBERT,
Rear Admiral, U. S. C. and G. S.,
Director.



CITY PLANNING BOARD
BOSTON MASS
WPA OFFICIAL PROJECT No 65-14-5744

TRIANGULATION NETWORK
FOR
CITY OF BOSTON

Aug 18 1938

INTRODUCTION

Need for the Work. Like most American cities, Boston has grown from a small community to its present size and importance by processes which were largely unplanned. In the early days land surveys incident to the layout of street and property boundaries were crude, as compared with modern methods. They were usually concerned with small areas, and were entirely unrelated with surveys of adjoining areas.

In the three hundred and twelve years that Boston has existed there has been a plethora of survey work done. Back through the centuries each survey has depended upon the previous surveys, which has caused continual conflicts in data, and has resulted in differences being argued or comprised in the courts with the consequent survey axiom that "Points on the ground hold" even though they were incorrectly placed.

In Boston, in particular, the original surveys are generally faulty and incomplete. In many instances, there are surplusages and shortages in block distances, and conflicting data, or the absence of any, in the location of street lines. In planning improvements, the city has no general map from which accurate fundamental information can be taken. All city planning involves the legal establishment of lines bounding certain districts reserved for certain purposes. Compliance with the plan requires a knowledge of the location of street lines and property, upon which the entire system is based.

There is a very definite need of a comprehensive engineering survey for Boston in conformity with the latest accepted technical methods. This information should be placed on property maps at a scale of forty or fifty feet to the inch, which permits the showing of all necessary data in sufficient detail to serve as an authoritative base map for the use of city departments and the community in general, in determining the exact position of all public property and street lines with the location of all buildings. Such a comprehensive survey is of permanent value. It is properly a capital expense frequently financed with bond issues authorized for the creation of permanent improvements. The city survey is an inventory of the physical facts relating to the land and its occupation. The value of these maps in the conduct of a city's business is being increasingly recognized by American city governments, as conditions of growth and progress make their use essential.

Boston Board of Survey 1885-1895. The first effort to make an accurate survey of the city with geodetic control was made by the Board of Survey when it was given authority by the Legislature, on May 11, 1891, to devise a scheme of streets for the entire city. The Board's prime function was to lay down a comprehensive system of streets providing for the growth and requirements of the future so as to avoid the confused network of streets in the then City Proper. The Board adopted a system of plane rectangular coordinates intended to furnish beyond dispute a basis for the description and absolute location of property.

A triangulation network was set up with several United States Coast and Geodetic Survey positions taken as primary points. The geodetic position of the State House was assumed as the initial point of the system and the geodetic azimuth and lengths were computed between the several stations by inverse L. M. Z. solutions.

The zero of the system of rectangular coordinates adopted was 50,000 feet south and 50,000 feet west of the position on the State House dome.

The triangulation was done with an instrument reading to ten seconds, and angles were turned two sets of twelve repetitions each. All positions were transferred to the ground and about one third of the city, mostly Dorchester, West Roxbury and Brighton, was mapped. It is to be regretted that this work was suspended after 1895. Further information as to the work of the Board of Survey may be obtained from their reports.*

Historical Sketch. In the summer of 1935, the City Planning Board made application to the Federal Emergency Relief Administration for an allotment of funds to make an Official Map of the City. On December 9 orders came through from the Works Progress Administration to start work on that day with an initial assignment of two hundred men, the assignment of more men to continue immediately. The project thus started from scratch without equipment or supplies. Equipment could not be procured immediately and new assignments, sometimes in batches of thirty or forty men, kept coming in daily.

Thus in the first year of the project the pressing need was to put men to work quickly. This meant putting the cart before the horse and doing the last work first. Accordingly the work of 1936 was spent, to a large extent, in utilizing the services of five hundred men on the cubage phase of the work. This was elementary and involved the recording in the field of the vertical and horizontal measurements of all buildings and the computation in the office of their cubic contents.

In June, 1936, Mr. Robert Randall of the National Resources Board paid a visit to the project office at its quarters on State Street. He contended that in order to obtain the required accuracy for detailed plans of a metropolitan city such as Boston it would be necessary to establish first-order control triangulation and traverse. He also recommended that the cubage phase be dropped since similar work was being done by another city department. Accordingly further field work on the taking of vertical house measurements was immediately stopped but the taking of plan measurements continued and was not suspended until March, 1937, when eighty-five per cent of the city had been covered.

In September, 1936, Mr. M. Y. Poling of the Washington Office of the W. P. A. visited the project and at a later visit in November recommended definite changes along the lines of a geodetic survey. He made several visits during the following year and was instrumental in procuring good cooperation between the project and the Area and State W. P. A. Offices. It was after Mr. Poling's November visit in 1936 that the first move towards geodetic control was made when a triangulation reconnaissance party was sent into the field.

In March, 1937, the project moved from 245 State Street to larger quarters at 838 Summer Street, South Boston. At this same time the entire cubage phase was eliminated and the personnel was cut to two hundred and ten men. During the remainder of the year the project made very definite progress when new organization and production control systems were set up. Emphasis was placed on the geodetic work and as it expanded the best men were assigned from the purely work relief items. Daytime observing parties were sent out in June, but so

* Annual Report of the Board of Survey for the year 1893. Annual Report of the Board of Survey for the year 1894.

much difficulty was encountered in getting good closures that a night observation program was set up in November. Early in December base taping started with invar equipment that had been loaned by the United States Coast and Geodetic Survey.

Mr. Poling made several visits during this year, showing the way, making several instructive field trips, and creating a general enthusiasm for the work. Mr. Poling's leadership and keen interest in the project was a most vital factor during the project's transition to a geodetic control survey. Also Lieut. Elliot B. Roberts of the Boston Station of the United States Coast and Geodetic Survey gave a good deal of time to the project, making many constructive criticisms on field trips, sitting in on conferences, and in particular instructing the base taping party.

1938 was the year of best operation for the project. Upon finishing the measurements of the first three bases in March, reconnaissance for the first-order control traverse was started. Traverse angle and taping observations began in August with the completion of the triangulation reconnaissance. In the meantime the project had assembled a complete outfit of base taping equipment. Since the tapes were made of steel it was necessary to measure at night. In October the remaining two bases were measured and the equipment was then loaned to other projects throughout the state. With the exception of a few ground transfers the triangulation field work was completed in December.

On the whole the year of 1939 was a year of good operation. During the winter a level reconnaissance party had been at work and in March an observation party started work on a system of first-order levels. Except for re-observation work nearly three hundred miles of field work on the first-order control traverse was completed.

However the office work had been seriously handicapped because of the delay in choosing the method of triangulation adjustment. The point at issue was that of making a simultaneous adjustment holding the Federal positions fixed or that of making sectional adjustments and independent of the fixed United States Coast and Geodetic Survey first-order stations in our network.

In August the City Planning Board ordered that the first method be used. Towards the end of the year it was discovered that there was trouble in the southwestern part of the net. It was then decided to remeasure the lower two bases with invar tapes.

In September of this year the project was dealt several consecutive blows from which it never recovered. At this time the project was transferred from the jurisdiction of the White Collar Division to that of the Operations Division of the W. P. A. with marked changes in control and administration. Shortly after this change, as a result of the ruling that W. P. A. employees must take a thirty-day furlough after eighteen months' continuous employment, one hundred and ten of the long service men out of the personnel of one hundred and seventy were suddenly dropped and were replaced with untrained men. In addition, a few of the key supervisors obtained private work. However, this was just the beginning of a general depletion in the personnel.

In February of 1940, because of discrepancies in preliminary computations, the two southerly bases were measured with invar tapes and though very small changes in the right direction were found they were nearly negligible and did not have any practicable effect on discrepancies in question. It was not until June that the United States Coast and Geodetic Survey was able to finally proceed with the adjustment. Many of the best men were leaving for other employment

and the project was overloaded with green men. Conferences at the Area and State Offices did not improve conditions and final work on the control traverse was held up pending the arrival of the final triangulation positions from Washington. This was the year of worst operation and very little was accomplished. Near the close of the year it was evident that the W. P. A. could not improve conditions and the full-time service of the sponsor's representative was withdrawn.

The project continued to operate under increasing personnel difficulties during the first six months of 1941. In January, the United States Coast and Geodetic Survey completed their adjustment and made available the results. Computations on the first-order traverse had previously been based on the project's independent adjustment. There were by now but few men who could do the final computations based on the new adjustment, and final coordinates were computed only in the East Boston section.

The past year and a half the project had been making efforts to attain results on supplementary traverse that had been run in East Boston and South Boston. Along with the fact that the field work was then two years old, the project was deteriorating very rapidly and no headway was made on the computation. The project closed abruptly on June 30. In August the Board retained the services of two capable men for a five-month period to put the working records in order.

ACKNOWLEDGMENTS

Works Progress and Work Projects Administration

It is recognized that without the allocation of funds by the W. P. A. this report would not be possible. Also that the efficiency of the project depended to a very large extent upon those in control of the W. P. A. organization. Smooth sailing in administration and operation could not be expected in a temporary relief organization whose main purpose was to put to work quickly large numbers of men of exceedingly diverse qualifications. Continuous training and an unceasing change in personnel, short work periods, different hours for different classifications, staggered shifts, cuts in pay and many other obstacles had to be taken in stride.

From the opening of the project in December, 1935, to September, 1939, the project operated under the jurisdiction of the White Collar Division of the W. P. A. Though at times, because of reasons beyond their control, there were troubles along the line, the State and Area Offices were sympathetic and quite helpful in enabling the project to carry on efficiently. While under the White Collar Division the project developed into a dependable and business-like organization and its procedure was used as an example for other city surveys throughout the state. Maps and charts were drawn up and sent to the National W. P. A. Office for circulation throughout the country.

The project was transferred to the Operations Division at a very critical time. The project was just beginning to feel the drain of the best men to private and national defense employment. In addition, the regulation calling for the suspension of the services of those who had worked continuously for eighteen months was soon put into effect. Under these conditions the project lost momentum and took a steady downhill course, very little of value being accomplished in the last year and a half.

To Mr. M. Y. Poling of the Washington Office of the W. P. A. great credit is due for sparking and crystallizing interest and enthusiasm on the project. It was during his several visits to the project from late in 1936 to early in 1938 that the project was remolded. His visits were looked forward to, not only for his technical advice and constructive criticism but also for the spiritual lift that he gave to the working organization.

While operating under the White Collar Division, Mr. Joseph V. Ware, Field Engineer for the Area Office, gave good service in liaison and personnel matters.

It is a privilege to say a word of appreciation to the workers on the project. For the greater part of the five and a half year life of the project the work was characterized by an unusual degree of efficiency and a splendid spirit of interest, loyalty and cooperation. The workers of the project, supervisors, technical, skilled and unskilled, displayed an interest and enthusiasm which is much to their credit and which is reflected in the accuracy of the finished parts of the work. Especially should be mentioned the perseverance of the men, who, under trying circumstances, struggled to carry on under obstacles that were beyond their control.

Since there were approximately seventeen hundred different workers on the pay roll at one time or another, it is impossible to single out many in the subordinate ranks whose work was of high order and who were very necessary and important cogs in the well-geared organization that existed for the greater part of the time.

During the first four years the sponsor's representative was allowed to act as the project executive both administratively and technically. This was a quite advantageous set-up as it placed central control in the hands of a single authority.

In accordance with the W. P. A. organization regulations Mr. Lewin Nelson was the Project Supervisor until his resignation in January, 1940, when he was succeeded by Mr. Henry A. Adelman. Upon Mr. Adelman's resignation in October Mr. Joseph Maguire took over the duties, to be later succeeded upon his resignation by Mr. Frank Tierney. In August, 1941, after the project had closed, the services of Mr. Iaroslav Malkin and Mr. Victor Peterson, as assistant, were retained by the Board to put the working material and computations in order. Their assignment on this work was abruptly terminated at the end of the year. They had in the meantime, however, accomplished most of their objectives and had submitted reports from time to time. The work in the body of this report under the heading of General Procedure in The Least Squares Adjustment, and containing explanations of the computation work, is entirely the work of Mr. Malkin whose ability is very much appreciated.

During the cubage phase of the project, Mr. Charles G. Loring with two assistants, Mr. Eugene Murphy and Mr. Robert Walsh, did yeoman work in organizing and carrying out the work of some three hundred men engaged on the house measurement phase.

With the closing of the cubage phase early in 1937 and the re-orientation of the project towards a Geodetic Control Survey the ingenuity, courage and energy of young engineers was called upon to rebuild. To Henry A. Adelman, general supervisor of the field survey, much credit is due. He displayed an untiring effort in organizing and maintaining the field work and was the driving force behind all field operations. Mr. Adelman was with the project until October, 1940, when

he took up work with the United States Navy Department. He was ably assisted by several other field supervisors. Joseph M. Dearborn, another untiring worker, contributed principally to the reconnaissance and preparation work both in triangulation and control traverse. He resigned in 1939 to take charge of a similar geodetic survey for the city of Bridgeport, Connecticut.

At this same time Mr. Vunaghan Shahpazian left the project for work with the United States Army Engineers. He was particularly effective where accuracy in detail was needed. Base and traverse taping and the laying out of control traverse were his particular contributions. Mr. Theodore Homkowicz gave valuable assistance on the night observation work as did Mr. Joseph A. Maguire in daytime observation. All of these men assisted at one time or another in carrying on location work for the plane survey that was being carried on concurrently with the geodetic work.

Though the computation department was much smaller and did not have the work subdivision of the field survey it had much pioneering work of a difficult nature to do and was at all times severely handicapped because of the lack of qualified men. Mr. Lewin Nelson headed the computation department from the beginning until his promotion to the position of Geodetic Engineer for the W. P. A. State Office in January, 1940. He pioneered particularly on the geodetic computations while maintaining supervision of the whole department. In addition, Mr. Nelson acted as the project head in the director's absence. Mr. Archie Legro, his assistant, spent most of his time on the geodetic work. He was particularly effective in scheduling the computation work and in initiating the method of junction point computation procedure followed. Credit should be given Mr. Iaroslav Malkin for solving intricate problems in the least squares adjustment and probable errors, etc.

Mr. Patrick Tierney after a short period as field survey supervisor took over the duties of the drafting division and did fine work in correlating the drafting work of the different departments.

United States Coast and Geodetic Survey

From the beginning very cordial relations were established with the United States Coast and Geodetic Survey both in the Boston Field Office and in the Washington Home Office. From the start it was the intention of the Board to base their work on and integrate it with the fundamental United States network. However, the W. P. A. authorities were of the opinion that the city should be adjusted in sections without regard to the Federal positions. This matter was left hanging until nearly a year after the field work was finished. Then when trouble developed in the southwestern part of the network it was too late to do any re-observing as all station towers were torn down and there was not competent skill left on the job to do it. If it had not been for this delay, there is no doubt that the triangulation accuracy would be much improved and it is likely that the first-order traverse would have been finished. The field work was finished in November, 1938, and it was not until June, 1940, that the Coast Survey was able to finally proceed with the simultaneous least squares adjustment. The final positions were not received until January, 1941.

The project is indebted to the United States Coast and Geodetic Survey for the loan of valuable base taping equipment on two occasions.

Many letters are on file in the office attesting to the suggestions and advice that were gladly given by the Washington Office.

Thanks are due to those in charge of the Boston Station for their willing cooperation. When the project opened Commander Peacock on several occasions willingly advised supervisors who were struggling to initiate the work. Towards the end of the project Lieutenant Moore extended the same service. Between their tours of duty Lieut. Elliot B. Roberts was in charge of the station. During the entire length of his tour of duty his services were always available. He was present during the smoothest working stage of the project and by his field visits and advice and recommendations on triangulation, base taping and levels contributed very heavily to that smooth operation.

MASSACHUSETTS GEODETIC SURVEY

To Mr. Elmer C. Houdlette, then Director of the Massachusetts Geodetic Survey, and to his assistants, many thanks are due for their splendid cooperation in allowing our supervisors to seek information at the Massachusetts Geodetic Survey Project.

The services of Mr. Humphries, Engineer of the Massachusetts Land Court, were greatly appreciated and his office was extensively used in obtaining Land Court data for the running out of street lines.

DIVERS ACKNOWLEDGMENTS

To Mr. William F. Sullivan, Chief Engineer of the Street Laying-Out Department, for providing space and access to records for some fifteen men who were compiling data for the use of street location field parties.

To the C. L. Berger Instrument Company, for interest shown and for conducting inspection trips through their factory as a part of the educational development of the field workers.

To the New England Telephone Company, for their contribution of 15,000 square feet of floor space at 245 State Street until the project moved to South Boston in March, 1937.

To the Emergency Planning and Research Bureau, for the loan of drafting furniture, which furniture was the property of Coolidge, Shepley, Bulfinch and Abbott; Cram and Ferguson; Stone and Webster; Charles T. Main, Inc.; Edison Electric Illuminating Company, and others.

Lastly, the cooperation of some seventy-five owners and tenants of private property and those in charge of public and semi-public buildings is greatly appreciated. In establishing triangulation stations it was necessary in many cases to gain access to the roof of high buildings while in other cases it was necessary to erect towers reaching forty feet in height on the property. In all but a very few instances, permission to occupy and use during the night was very cheerfully given.

TRIANGULATION

The triangulation net is the foundation of the horizontal survey system. It is basically a system of connected quadrilaterals containing overlapping triangles, the angles of which are measured accurately. At proper intervals one side of a triangle, known as a base line, is measured upon the ground and the lengths of all the other lines of the net are computed from it by trigonometric formulas. The overlapping

of the triangles result in certain geometrical figures which with the triangles themselves are subject to rigid geometrical laws and insure great accuracy after adjustment.

FIELD PROCEDURE

The field work was divided into six operations, namely, reconnaissance, monument setting, preparation (construction of signals and towers), observation of angles, transfer of roof station positions to ground reference monuments, and base measurement.

The locations of stations and base lines were based on a thorough field reconnaissance. This included visiting all prospective station locations and plotting, on a plane table, rays to all other potential stations. The general scheme of the triangulation was determined by studying the best combination of figure strength after rejecting all sights and stations that were not essential or were undesirable because of smoke interference or horizontal refraction. The reconnaissance also provided for a pair of ground reference monuments near each roof station and at other main stations. A prime essential in the reconnaissance was that of incorporating the six United States Coast and Geodetic Survey first-order stations in the Boston area and the using of as many stations of the Massachusetts Geodetic Survey as possible. In order to cover the area properly it was necessary to locate stations in the metropolitan municipalities of Revere, Chelsea, Cambridge, Watertown, Newton, Brookline, Needham, Dedham, Milton and Quincy. Cities conducting surveys to the north made plans to tie into the Boston system. The final system contained six United States Coast and Geodetic Survey first-order stations and one of second-order, six Massachusetts Geodetic Survey stations, and four United States Coast and Geodetic Survey stations tied in as intersecting stations.

Of the sixty-five main stations only eighteen could be observed from instrument set-ups. Twenty-two wooden towers were erected, the maximum being forty-one feet in height, one at thirty-one feet, four at twenty-two feet, five at eighteen feet and eleven at various heights down to ten feet. In addition, twenty-five of the stations had small towers or roof stands from five to nine feet in height. With a few exceptions stations located on roofs of buildings were marked by a bronze marker placed in a small mound of concrete which in turn was firmly attached to the roof surface so as to prevent creeping.

The location and transfer of base lines offered particularly perplexing problems. In order to obtain a high strength of figure between bases it was necessary to search for long level courses, and because of the topography and cultural development of the city, such long base-line courses are infrequent and not always well adapted for incorporating into the main scheme. Five base lines were selected. Base No. 1 on the Revere Beach Parkway in Revere was the most favorable one because the two ends were ground stations in the first quadrilateral. Base No. 2 was the shortest base, measuring only a mile on Mile Road in Dorchester. One end was a ground station and the other end had to be transferred up to roof station Skinner by means of a triangle. Base No. 3 was located in Brighton on Lincoln Street. This base was transferred up to Stations Palm and Lincoln by means of triangles and a twisted quadrilateral which gave good strength. Base No. 4, Need-Brow, was the longest base measuring 6,442 feet along the New York, New Haven & Hartford Railroad right-of-way in Boston and Needham.

40-FOOT TOWER AT WALNUT HILL

OBSERVING TO GROUND TRANSFER AT STATION KILMER

BASE TAPING -- FORWARD END

BASE TAPING -- REAR END

FIELD SURVEY

TRANSPORTATION

TRIANGULATION RECONNAISSANCE

PREPARATION AT STATION FOREST HILLS

Unfortunately because of deep cuts, the ends of this base could not be used as ground stations and had to be transferred to the top of the banks by means of small quadrilateral transfer figures. Base No. 5, Paine-Codman, along Talbot Avenue in Dorchester, was, perhaps, the weakest base being transferred at both ends by means of double triangles.

Base line measurement was accomplished by a nine-man field party, working as much as possible on cloudy and windless days in order to procure the best conditions for base measuring. All bases were measured with equipment loaned by the United States Coast and Geodetic Survey. The bases were measured in the winter when snow was off the ground. The equipment consisted of four invar tapes, one for checking use only, fifty meters in length; special thermometers for measuring tape temperatures; calibrated spring balances for applying tension to the tape and tape stretching devices. This equipment was tested by the United States Bureau of Standards. Portable supports were used for tape contacts, level and level rod for determining elevations at the ends of the tape and a special stand for supporting the tape at the twenty-five-meter mark. Each base was divided into three sections and each section was measured at least three times with different tapes and in different directions or until a satisfactory probable error of length was secured.

Bases Nos. 4 and 5 were also measured with fifty-meter steel tapes at night in the same manner. This required extra men to carry lights and to move the equipment. The project assembled a kit of steel base tape equipment which was later loaned to other projects. It was intended to use these steel tape measurements but when a question arose as to weakness in the lower network the two lower bases were remeasured with invar. Negligible differences of 1.1 mm. and 3.7 mm., respectively, were found but were in the right direction however.

Signals used for daytime operation were in the form of equilateral triangular targets with the apex at the bottom attached to $1\frac{1}{4}$-inch poles set over the point. The targets were painted black and white, there being a white diamond in the center and the long axis of the diamond extending to the full height of the triangle. The triangular target measured 15 inches on a side.

In order to assure accurate pointings and to eliminate "phase" the targets were always faced toward the station being occupied and the axis of the diamond collimated by the observing party.

Signals for night work were fashioned on the job and consisted of small wooden frames with a flashlight fixed in the center. The size of lens and mask varied with the sighting conditions. As seventy-five per cent of the observing was done at night it was found efficient and convenient to have a special collimating party whose function was to set and collimate all signals in the late afternoon and early evening. Lightkeepers were used to some extent and a flash code was used for communication with the observer. Each observing party was equipped with a truck used for further liaison work between stations.

The observation of the angles was effected usually by a four-man party, an observer, recorder, and two or more assistants. A great deal of the observation was done on cold winter nights and it was found practical to shift observers between sets and stations in order to give relief from the cold and eye strain. The instrument used was an American made ten-second, three-screw, repeating theodolite with the telescope field illuminated for night work. On daytime

observation, the instrument was shielded from the sun by an umbrella, and canvas shields were used for wind breaks. The observing program consisted in turning five sets of twelve repetitions each per angle. Five seconds was the maximum difference allowed between high and low values for an angle in a set. A further field check was made in the horizon closure with an allowance of one second per angle or not more than five seconds for a multiple ray station.

The transferring of the roof stations to ground reference monuments was effected by two separate parties who had observing experience. In the downtown area this also had to be done at night. The method utilized one or two small triangles, each triangle has one side, and all its angles measured, thus affording in every case at least one trigonometric condition. Such transfer triangles were in all cases oriented with the main scheme through an azimuth angle, that is, an angle from one of the ground markers to a distant station. This angle and all angles in the transfer figure were measured with triangulation accuracy in order to insure that the starting azimuths of the traverse originating at such stations might be satisfactorily accurate. The short base lines between the reference monuments of the transfer triangles were measured by the first-order chaining parties using traverse equipment. There were forty-seven transfer stations.

Observation for astronomic azimuth was not necessary because of the azimuths supplied by the first-order United States Coast and Geodetic Survey positions incorporated in the Boston network.

REVIEW OF THE GENERAL PROCEDURE IN THE LEAST SQUARES ADJUSTMENT

Introductory Remarks. The following represents a brief account of the office procedure in the adjustment of a triangulation net starting from the base lines and angles measured in the net and progressing to the establishment of the fundamental elements for the control traverse. Some questions requiring a more detailed discussion are treated in the Appendix. A complete List of Operations in the Procedure of Adjustment is given on page 20.

Base Lines. The base lines are generally the only actually (directly or indirectly) measured lines in the triangulation net. The most desirable kind of base lines are the directly measured or ground base lines. It is, however, often necessary to transfer a directly measured ground base, by means of additional observation points and angles with a subsequent trigonometrical computation to a (thus indirectly measured) aerial base, as it would not be otherwise possible to observe adjacent stations from the ends of the base line. The transfer to an aerial base is always accompanied by a loss in accuracy. The degree of accuracy to which the length of a base line should be determined is characterized by an allowable probable error not larger than 1:600,000.

The length of a *Ground Base* is determined from repeated forward and backward measurements of several ground base sections. The tapes used in such measurements are generally invar tapes throughout. with an additional steel tape for broken lengths only, all tapes being standardized by the United States Bureau of Standards in Washington. The length calculation of a ground base line and of its probable error is standardized by existing computation forms. In the case of a transfer to an *Aerial Base* the length computation and especially that of the probable error are considerably more complicated.

Angles. The base lines of a triangulation net are interrelated among themselves by means of the angles of the net (see below), which are measured very elaborately with the aid of the theodolite. These angles are, of course, not all independent of each other, and there are, besides the length relations between the bases, certain mathematical laws which are to be fulfilled by the angles. The degree to which the measured angles actually comply with those laws is examined in the "Triangle Closures" and "Side Equation Test" sheets. These sheets will be referred to subsequently on page 18. Both sets of sheets will show, in general, certain small deviations from those laws, and there will be also some deviations from those length relations between the measured bases; all of these small deviations are to be taken care of in the procedure of the "Least Squares Adjustment" of the triangulation net (see page 18).

Remarks Concerning Accuracy to be Attained in the Computation of Lengths in the Net. Knowing the angles of the net and one base length it is possible to compute trigonometrically all of the distances between triangulation stations; especially, it is then possible to compute, starting from that one base line, any one of the remaining base lines, which gives a length check between bases (see page 18).

If the computation of lengths in the triangulation net is to be of sufficient accuracy, a certain condition must be imposed on the selection of the shape of the triangulation units (quadrilaterals). This condition can be stated as follows:

The procedure of adjustment will consist in the elimination in some definite manner of the small deviations mentioned above. These small deviations indicate, evidently, uncertainties in the angle determination. The computation of the distances will be naturally affected by those uncertainties in the angle determination. It is, however, possible to shape the quadrilaterals in such a manner as to counteract, to a considerable degree, the sensibility of those computations for angle inaccuracies. The mathematical expression for this reduction of sensibility of computation, and thus for increased accuracy, is the strength of figure.

Strength of Figure. The length computation carried out through a chain of triangles of the net, is the more accurate, the less the amount of logarithmic sine differences, obtained by a small change (taken to 1 second) in each of the angles involved. This amount, represented by a certain quadratic expression, called R, in the logarithmic sine differences, is computed and tabulated once for all for single triangles. In a chain of triangles the R-value of the chain is obtained by summation of the R-values of the single triangles involved. In this manner we obtain, for each path chosen for length computation from a known line, a certain index R of accuracy characteristic for that path: the smaller the R value, the less the sensibility of the length computation for the uncertainties in the angles. The sum of the R values, or R, plays a part in the specifications concerning length check between base lines of a triangulation net (see Manual No. 10 of the ASCE, page 11, Specification 3, a). The strength of figure for triangulation units is computed on standard forms.

Problem of Least Squares Adjustment. It has been already emphasized in the preceding sections that the angles measured in the triangulation net are affected by inaccuracies causing some small

deviations from certain mathematical laws and from the length relations between bases. The ultimate problem of adjustment is

(*a*) to determine the most probable, or best available, values for those angles and the lengths between the triangulation stations.
(*b*) making, at the same time, all corrected elements of the net consistent with each other and with the fixed values of the base lengths.

The most probable values [requirement (*a*)] are derived from the Principle of the Least Squares, which finds its mathematical expression, in a problem of the Theory of Minima of Functions; the consistency of the results [requirements (*b*)] is ensured by the Condition Equations.

Minimum Problem with Condition Equations. In a more exact mathematical statement the minimum problem of the adjustment consists in such determination of the directions in the triangulation net, that the sum of the squares of the necessary corrections to the directions be the least possible under the prevailing conditions. These conditions have been already outlined above; they are represented by the requirement of eliminating all discrepancies

(*a*) in the triangle closures (see page 17),
(*b*) in the side equation tests (see page 17),
(*c*) in the length equations between measured bases, the paths being determined by sufficiently small values of the ΣR (see page 17).

In larger nets like those occuring in the adjustments of the CGS in Washington, D. C., additional condition equations are generally used, taking care of discrepancies in geographic positions and in azimuths; it is, however, not necessary to consider such additional condition equations any further here.

Remarks Concerning the Purely Mathematical Procedure in the Least Squares Adjustment. The minimum problem, indicated in the preceding paragraph, is characterized by a large number of unknowns (corrections to the observed directions) and of condition equations. The numerical solution of such a problem is naturally very complicated and cumbersome notwithstanding the simplifications introduced by great mathematical authorities. In the present short review the single operations can be only registered into which the least squares adjustment is subdivided. These single operations and their order are given in the following scheme:

(*a*) Correlate Equations derived from the Condition Equations;
(*b*) Formation of Normal Equations from Correlate Equations;
(*c*) Arrangement of Normal Equations in proper order for solution;
(*d*) Forward Solution of Normal Equations;
(*e*) Back Solution;
(*f*) Computation of Corrections to Directions;
(*g*) Final List of Directions for entire net;
(*h*) Computation of Triangles (geodetic distances between triangulation stations).

The ordering of the normal equations, operation (*c*), not mentioned in the Manual No. 10 of the ASCE, is practically very important in so far as a proper arrangement of the equations shortens the computing work very considerably.

Criteria for Acceptability of the Results of the Least Squares Adjustment. The specifications for city surveys (see Manual No. 10 of the ASCE, pp. 11–12) call for an average correction to a direction not exceeding 0°0′0.75″, and for a probable error of an observed direction not exceeding 0°0′0.75″. A further criterion refers to the length checks between measured base lines after adjustment of angle and side equations; for a discussion of this criterion see the Appendix. The criterion concerning the strength of figure was already referred to on page 17.

Computation of the Geographic Positions and Azimuths in the Triangulation Net. If the geographic positions of two adjacent triangulation stations and the geodetic azimuth between them are known, the geographic positions and azimuths can be computed throughout the net from station to station. This computation requires the use of all adjusted angles and of all distances between triangulation stations as obtained from the final list of directions and from the computation of triangles respectively. All necessary information concerning the theory of the subject and the computing procedure for the geographic positions and azimuths are given in Government Publication No. 8 of the United States Coast and Geodetic Survey.

Computation of the Lambert Coordinates of Triangulation Stations and of the Grid Azimuths between the Stations. The geographic positions and azimuths are referred to the *curved* earth surface; for practical purposes it is, however, desirable to have the entire triangulation net represented on a plane map. But as the earth surface does not belong to those surfaces (called "developable" surfaces), which can be "straightened out" on a plane without any distortions, it is necessary to approximate the earth surface by a developable surface and to establish an approximately distortionless point to point correspondence between the earth surface and the substituted developable surface.

A solution of this problem is given in the so-called Lambert Projection, in which the surface of a comparatively narrow strip of land between two parallels of the earth spheroid is approximated by a substituted narrow ring strip of surface of a straight circular cone, with the meridians of the spheroid corresponding to the straight generating lines of the cone. As to the question of the mutual point to point correspondence it must be said that a point of a meridian on the spheroid obviously transforms to a point on the corresponding straight generating line of the cone; the exact location of the point on the straight generating line is, however, determined by a certain formula, which does not admit of a similarly simple interpretation. It is sufficient to know that by virtue of this formula the representation on the straightened out conical surface is always strictly to scale, only the scale varies a little from parallel to parallel on the spheroid. The computation of the Lambert coordinates of the triangulation stations is made on standard forms. The grid azimuths between the triangulation stations are computed immediately from the Lambert coordinates.

Computation of the Lambert Coordinates and Grid Azimuths for the Traverse Transfer Triangles. The triangulation stations are the points to which the control traverse net is tied in, either imme-

diately or by means of transfer triangles. In the latter case, the Lambert coordinates and grid azimuths must be computed for the transfers additionally, starting from the known Lambert coordinates and grid azimuths of the involved triangulation stations on the one hand and the elements of the adjusted transfer figures on the other.

This operation completes the triangulation proper and leads to the control traverse.

LIST OF OPERATIONS IN THE PROCEDURE OF ADJUSTMENT

1. Length Computation of a Ground Base Section.
2. Computation of Length and Probable Error of the entire Ground Base Line.
3. Computation of Length and Probable Error of an Aerial Base Line (if Ground Base transferred to Aerial Base).
4.* Computation of Triangle Closures.
5. Side Equation Tests.
6. Computation of Strength of Figure for Triangulation Units.
7. Computation of Strength of Figure for Chosen Paths between Base Lines.
8. Length Equations between Bases.
9. Formation of Condition Equations from Operations 4 (Triangle Closures) 5 (Side Equation Tests) and 8 (Lengths Checks between Bases).
10. Correlate Equations derived from Condition Equations.
11. Formation of Normal Equations from Condition Equations.
12. Arrangement of Normal Equations in proper order for Solution.
13. Forward Solution of Normal Equations.
14. Back Solution.
15. Computation of Corrections to Directions.
16. Final List of Directions for entire Net.
17. Computation of triangles (Geodetic Distance between Triangulation Stations).
18. Computation of the Geographic Positions of the Triangulation Stations and of the Geodetic Azimuths between them.
19. Computation of the Lambert Coordinates of the Triangulation Stations.
20. Computation of the Grid Azimuths between the Triangulation Stations.
21. Computation of the Lambert Coordinates and the Grid Azimuths for the Traverse Transfer Triangles.

SPECIAL OPERATIONS

In the Triangulation Problem of a large area like that of the City of Boston there often occur points at which it is difficult to comply with all requirements of a regular adjustment. Such points give rise to additional operations of some unusual character. In the adjustment of the City of Boston area such additional special operations were necessary at the points Belle-CGS and Kilmer.

Eccentric Reduction at Belle CGS. As seen already from the designation, the station Belle CGS is originally a Federal CGS station incorporated in the City of Boston net. Nine adjacent stations of the Boston area had to be observed from Belle CGS, namely, Peabody,

* See the subsequent remarks on "Special Operations" following.

Walnut Hill, Faulkner, Heart, Rose, Rogers, Fair, View, Brow (see below about Kilmer). Of these nine stations the last five are invisible from Belle CGS. To remedy the situation an auxiliary station Belle Ecc. was established in the vicinity of Belle CGS, and the five points indicated were observed from Belle Ecc., and *vice versa*. Knowing the distance between the original station Belle CGS and the substituted station Belle Ecc. and using the observations made from the latter, the corrections can be computed trigonometrically, from the elements of the (thus far unadjusted) net, which are to be added algebraically to the angles concerned, obtained with the eccentric station, in order to get the required angles of the net with the original station Belle CGS. In this manner (*cf.* Manual No. 10 of the ASCE, 1934, p. 34) the missing angles at Belle CGS have been computed before application of the least squares adjustment to the entire Net.

Quadrilateral with Concluded Diagonals at Kilmer. Still greater difficulties were encountered at station Kilmer. The environment of Kilmer is very irregular, with obstacles making the observations impossible along the lines Brow-View and Kilmer-Belle (CGS or Ecc.). To erect an observation tower at Kilmer would be too costly. A somewhat rude operation was substituted instead, namely, the computation of the missing elements from the known (but unadjusted) adjacent elements of the Net, and these concluded elements were then introduced in the procedure of the least squares adjustment.

BASE LINE MEASUREMENTS

LENGTH AND PROBABLE ERROR OF THE BASE LINES

The triangulation net of the City of Boston area has five base lines, namely—

Base Line No. 1	POPE–SLADE	Ground Base
Base Line No. 2	MILE–SKINNER	Aerial Base
Base Line No. 3	PALM–LINCAM	Aerial Base
Base Line No. 4	NEED–BROW	Aerial Base
Base Line No. 5	PAINE–CODMAN	Aerial Base

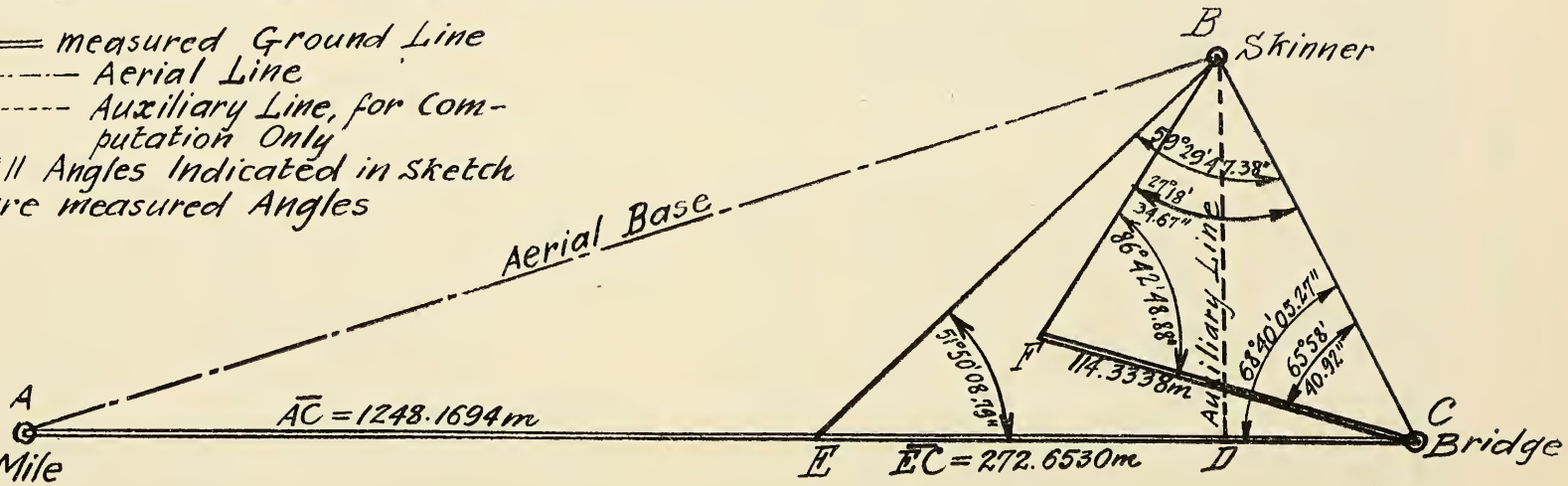
Invar tapes have been used for all ground length measurements, except broken lengths, for which steel tapes have been used. The arrangement of measurements is illustrated by sketches, as far as aerial bases are concerned. It should be noted in this connection, in order to avoid misunderstandings, that the length of an "aerial base" is actually the length of its horizontal projection, as the angles measured with the theodolite are always angles measured between the vertical planes in which the sight rays are located.

Base Line No. 1 (POPE=SLADE). Ground base line, measured in three sections.

Total length	1,342.7753m.
Probable Error	1:1,637,500

Base Line No. 2 (Mile-Skinner):

═══ measured Ground Line
–·–·– Aerial Line
----- Auxiliary Line, for Computation Only
All Angles Indicated in Sketch are measured Angles



Base Line No. 2 (MILE=SKINNER). (*Cf.* Concluding Remarks.)
A. Computation by least squares adjustment: The triangles BCE and BCF (see sketch) were adjusted in using the following three condition equations:

(1) Angle equation for triangle BCE.
(2) Angle equation for triangle BCF.
(3) Length equation CE to CF.

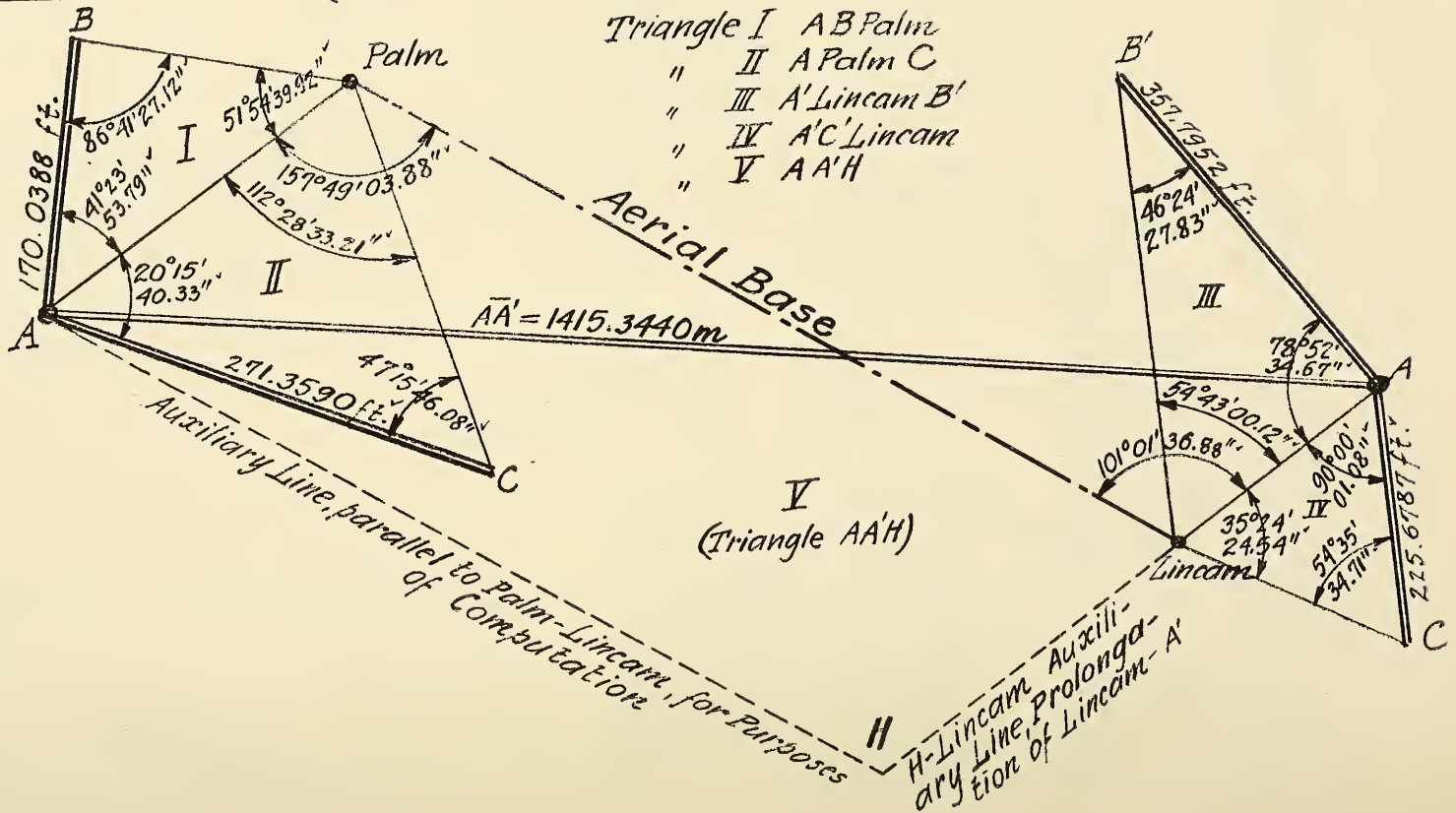
Starting from results of this adjustment the length of aerial base line Mile-Skinner was computed, and it was found:

Mile-Skinner = 1,180.6336m.
Probable error = 1:335.000

B. Computation by means of separate adjustment of the triangles BCE and BCF for Angle closures only: The length BC was computed first from the triangle BCE, using the adjusted angles of this triangle, and, secondly, from the triangle BCF, using the adjusted angles of the same. Each of these two computations of BC was then used for a separate calculation of the length Mile-Skinner:

(*a*) Using the length BC as computed in the triangle BCE the length Mile-Skinner . . . . . = 1,180.6316m.
with a probable error . . . . . = 1:580,000;
(*b*) Using the length BC as computed in the triangle BCF the length Mile-Skinner . . . . . = 1,180.6335m.
with a probable error . . . . . = 1:555,000.
Length finally adopted . . MILE–SKINNER = 1,180.6325m.

Base Line No. 3 (Palm - Lincam).



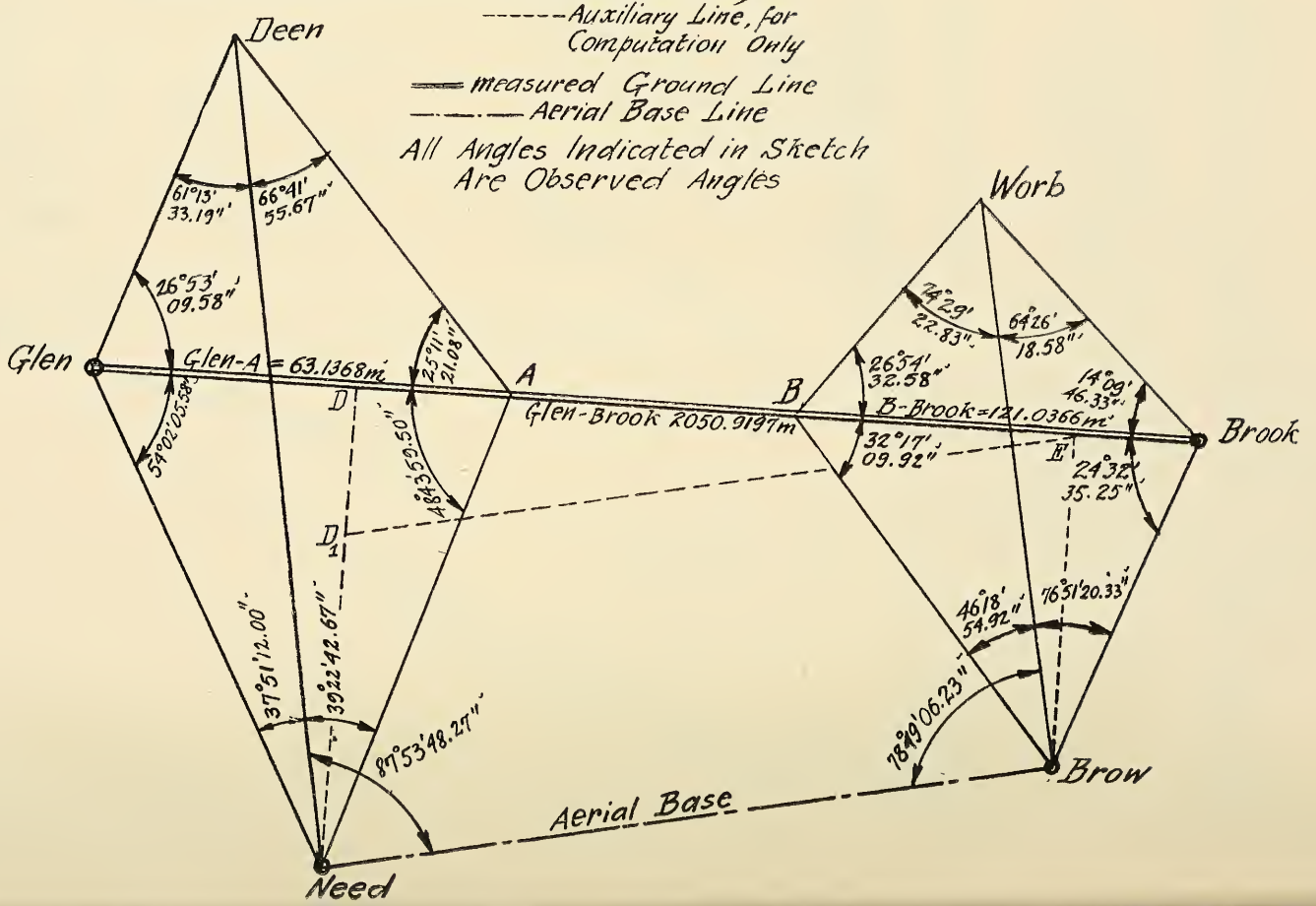
Base Line No. 3 (PALM=LINCAM). The least squares adjustment of the serial transfer figure was made in using the following condition equations (see sketch):

(1) Angle equation for the triangle No. I (A-B-Palm)
(2) Angle equation for the triangle No. II (A-Palm-C)
(3) Angle equation for the triangle No. III (A′-Lincam-B′)
(4) Angle equation for the triangle No. IV (A′-C′-Lincam)
(5) Angle equation for the triangle No. V (A-A′-H)
(6) Length equation from AB to AC.
(7) Length equation from A′B′to A′C′.

In using the results of this adjustment the length of the aerial base Palm-Lincam was calculated starting from the computed distances A-Palm and A′-Lincam, and the final result was

PALM–LINCAM = 1,330.8823m.
Probable error = 1:745,000

Base Line No.4 (Need-Brow):



Base Line No. 4 (NEED-BROW). The ground base was originally measured with steel tapes. Due to objections by the CGS in Washington, D. C., the line was remeasured with invar tapes in March and April, 1940; the ground distance found was 0.4 mm. shorter than that obtained from measurements with steel tapes.

The measurements made with the invar tapes were used in the least squares adjustment of the aerial transfer figure. The adjustment is based upon the following condition equations (see sketch):

(1) Angle equation for the triangle A-Need-Glen.
(2) Angle equation for the triangle Need-Glen-Deen.
(3) Angle equation for the triangle Deen-A-Need.
(4) Angle equation for the triangle Brook-Brow-B.
(5) Angle equation for the triangle Brow-B-Worb.
(6) Angle equation for the triangle Worb-Brook-Brow.
(7) Side equation with the pole at Deen.
(8) Side equation with the pole at B.
(9) Angle equation for the quadrilateral Need-Glen-Brook-Brow.

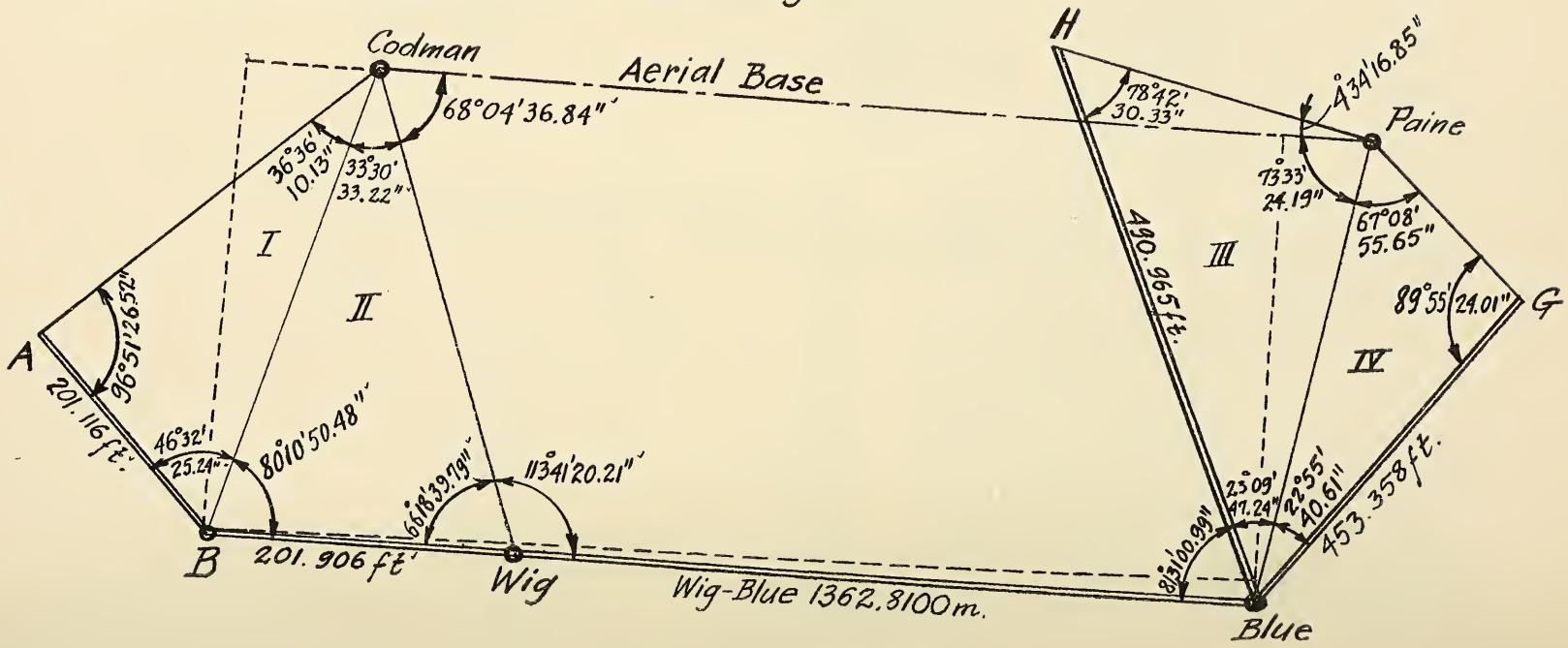
In using the results of this adjustment the length of the aerial base Need-Brow and its probable error have been computed as follows:

NEED-BROW = 1,952.0903m.
Probable error = 1:1,000,000.

(From the earlier measurements with steel tapes the length obtained was 1,952.0914m.)

Base Line No. 5 (Paine-Codman):

----- Auxiliary Line for Computation Only
═══ Measured Ground Line
——·—— Aerial Base
All Angles Indicated Are Observed Angles



Base Line No. 5 (PAINE-CODMAN). (*Cf.* Concluding Remarks.) The ground base was originally measured with steel tapes. This base was also remeasured with invar tapes in March and April, 1940. The ground base measured with invar tapes is 0.8 mm. longer than that measured with steel tapes.

The measurements made with invar tapes were used in the computation of the aerial base Paine-Codman.

A. Least squares adjustment in using the following condition equations (see sketch):

(1) Angle equation for the triangle No. I (B-A-Codman)
(2) Angle equation for the triangle No. II (B-Codman-Wig)
(3) Angle equation for the triangle No. III (Blue-H-Paine)
(4) Angle equation for the triangle No. IV (Blue-Paine-G)
(5) Angle equation for the quadrilaterial B-Codman-Paine-Blue
(6) Length equation AB to B-Wig
(7) Length equation H-Blue to Blue-Wig

In using the results of this adjustment the aerial base Paine-Codman was found to be 1,445.6224m. long (before tape restandardization), with a probable error of 1:338,000.

B. Least squares adjustment in using all above condition equations with exception of equation A, (5), *i. e.*, the angle equation for the quadrilateral B-Codman-Paine-Blue. The length of the aerial base Paine-Codman obtained from this adjustment was 1,445.6143m. (before tape restandardization). This length was too short as concluded from the length check with base No. 4 (Need-Brow).

C. The triangles Nos. I–IV were adjusted for angle closures only independently of each other. Using then the length B-Codman, as computed from triangle No. III, the aerial base, Paine-Codman was calculated and it was found to be 1,445.6206m. long (taking tape restandardization into account), with a probable error of 1-1,550,000.

Length finally adopted . . PAINE–CODMAN = 1,445.6206

(The length of the same aerial base line as obtained from measurements with steel tapes was 1,445.6169m.)

CONCLUDING REMARKS

The most reliable procedure of computing the length and the probable error of an aerial base is naturally derived from a least squares adjustment of the transfer figure. As seen from the above review of the transfer computations, the probable errors, computed on the basis of a least squares adjustment, did not always comply with the specifications which call for a probable error of

1:600,000 or better.

Due to very difficult conditions for remeasurement of the transfer figures it was practically impossible to secure more reliable data for readjustment of the transfer figures involved. Therefore other less satisfactory methods of adjustment have been used in some cases, as indicated in the above representation. It must be remarked, however, that the length differences resulting from use of different methods of adjustment are practically insignificant in the cases considered.

STATISTICS OF TRIANGULATION ADJUSTMENT

Total number of triangles	170
Number of triangles with plus closures	79
Number of triangles with minus closures	89
Number of concluded triangles	2
Average closure of triangles without regard to sign	1″.24
Maximum closure of a triangle	3″.63
Average correction to a direction without regard to sign	0″.76
Maximum correction to a direction	3″.62
Probable error of an observed direction	±0″.94
Average correction to a direction to satisfy side equation	0″.28
Maximum correction to a direction to satisfy side equation	0″.83
Average probable error in length	1:60,000

DRAFTING ROOM

TABLE NO. I

Description of Triangulation Stations

Table No. I includes detailed descriptions of all triangulation stations, arranged in alphabetical order. A sketch accompanies each written description. Included also in this table are the detailed descriptions of the transfer stations, or ground reference markers.

Caution. Distances on description cards are in meters. Distances on sketches are in feet except where noted by a small "m", which signifies meters.

EXPLANATION OF NOTE REFERENCES ON DESCRIPTION CARDS*

SURFACE MARKS

NOTE 0—A brass tack in lead plug set in (*a*) granite monument, (*b*) top of stone coping of parapet, (*c*) granite wall.

NOTE 1—A standard disk station mark set in the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

NOTE 2—A standard disk station mark wedged in a drill hole in outcropping bedrock (*a*) and surrounded by a triangle chiseled in the rock, (*b*) and surrounded by a circle chiseled in the rock, (*c*) at the intersection of two lines chiseled in the rock.

NOTE 3—A standard disk station mark set in concrete in a depression in outcropping bedrock.

NOTE 4—A standard disk station mark wedged in a drill hole in a bowlder.

NOTE 5—A standard disk station mark set in concrete in a depression in a bowlder.

NOTE 6—A standard disk station mark set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

UNDERGROUND MARKS

NOTE 7—A block of concrete 3 feet below the ground containing at the center of its upper surface (*a*) a standard disk station mark, (*b*) a copper bolt projecting slightly above the concrete, (*c*) an iron nail with the point projecting above the concrete, (*d*) a glass bottle with the neck projecting a little above the concrete, (*e*) an earthenware jug with the mouth projecting a little above the concrete.

NOTE 8—In bedrock (*a*) a standard disk station mark wedged in a drill hole, (*b*) a standard disk station mark set in concrete in a depression, (*c*) a copper bolt set in cement in a drill hole or depression, (*d*) an iron spike set point up in cement in a drill hole or depression.

NOTE 9—In a bowlder 3 feet below the ground (*a*) a standard disk station mark wedged in a drill hole, (*b*) a standard disk station mark set in concrete in a depression, (*c*) a copper bolt set with cement in a drill hole or depression, (*d*) an iron spike set with cement in a drill hole or depression.

NOTE 10—Embedded in earth 3 feet below the surface of the ground (*a*) a bottle in an upright position, (*b*) an earthenware jug in an upright position, (*c*) a brick in a horizontal position with a drill hole in its upper surface.

REFERENCE MARKS

NOTE 11—A standard disk reference mark with an arrow pointing toward the station, set at the center of the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

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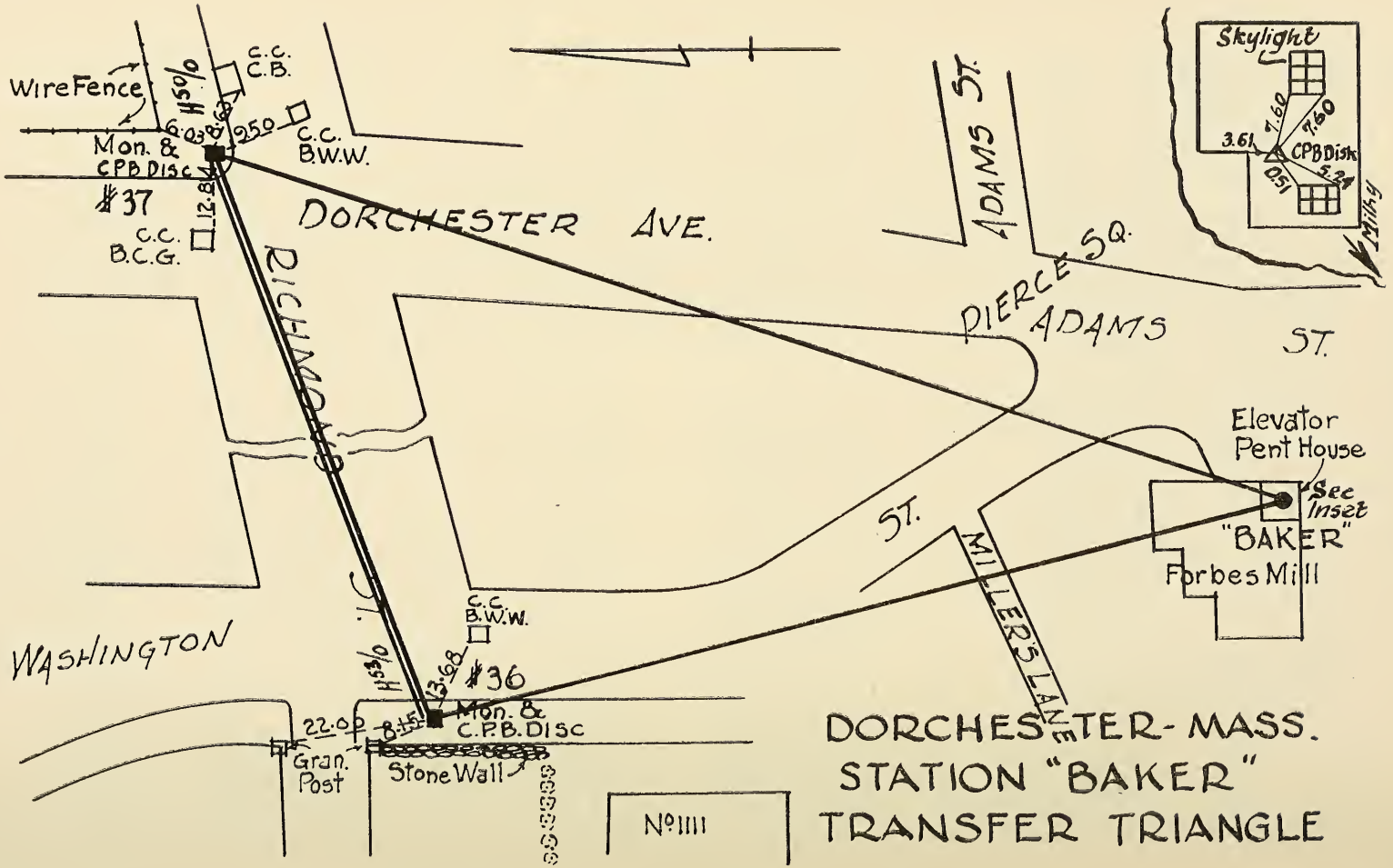
* From United States Coast and Geodetic Survey publication.

NOTE 12—A standard disk reference mark with the arrow pointing toward the station (*a*) wedged in a drill hole in outcropping bedrock, (*b*) set in concrete in a depression in outcropping bedrock, (*c*) wedged in a drill hole in a bowlder, (*d*) set in concrete in a depression in a bowlder.

NOTE 13—A standard disk reference mark with the arrow pointing toward the station, set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

NOTE 14—Corner of lower course of (*a*) brick or stone air shaft, (*b*) brick or stone chimney, (*c*) brick or stone penthouse, (*d*) brick or stone parapet wall.


Wire Fence
H5%
C.C.
C.B.
6.03
8.63
2.50
C.C.
B.W.W.
Mon. &
C.P.B. Disc
#37
12.8
C.C.
B.C.G.
DORCHESTER AVE.
ADAMS ST.
PIERCE SQ.
ADAMS ST.
RICHMOND ST.
Skylight
7.60
7.60
3.61
CPB Disk
5.24
0.51
Milky
Elevator
Pent House
See
Inset
"BAKER"
Forbes Mill
ST.
MILLER'S LANE
WASHINGTON
C.C.
B.W.W.
H5%
13.68
#36
Mon. &
C.P.B. Disc
22.0
8.15
Gran.
Post
Stone Wall
No 1111
DORCHESTER-MASS.
STATION "BAKER"
TRANSFER TRIANGLE

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BAKER STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938. LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Milhy	1890.05		39 04 46.89
No Ref. Marks			
Ties only			

Detailed Description:

A C. P. B. disc set in concrete pimple 4 inches above tar and gravel roof on the stairway penthouse of the Forbes Mill of the Walter Baker Chocolate Company, Inc., Dorchester, Mass.

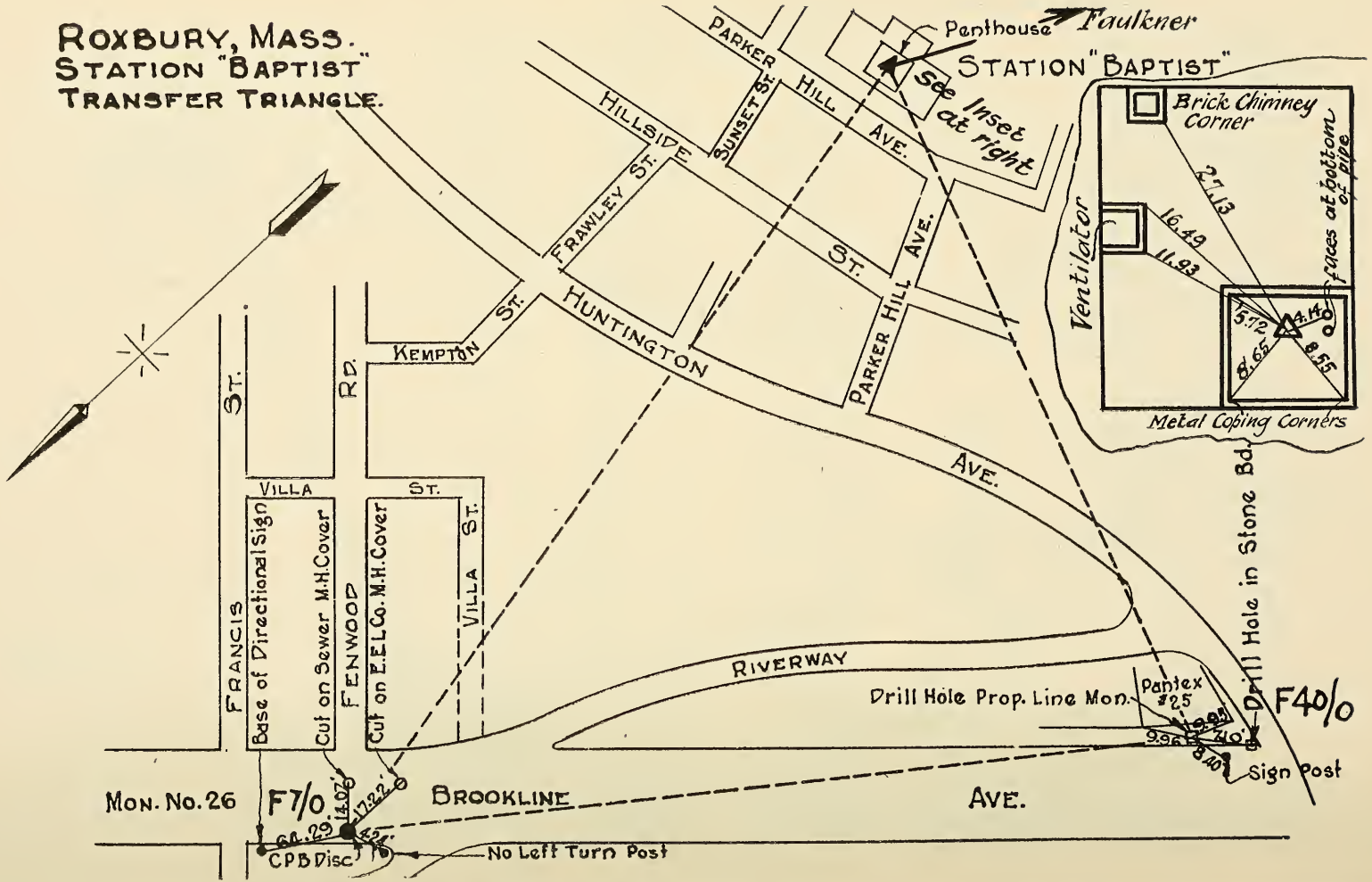
Visibility is limited in the northerly quadrants due to adjacent hill and the superstructure supporting sign on roof.

Station is best reached by taking Dorchester Avenue to River Street and Dorchester Lower Mills.

Described by H. ADELMAN Marked by.....

GROUND TRANSFER POINT, "BAKER" MONUMENT No. 36 — (First order traverse point No. H53/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with concrete sidewalk located on the west side of Washington Street, opposite Richmond Street.
Southeast 8.15′ from corner of granite post in stone wall.
South 22.00′ from corner granite post.
Northwest 13.68′ from c. c. B. W. W.

GROUND TRANSFER POINT, "BAKER" MONUMENT No. 37 — (First order traverse point No. H50/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with concrete sidewalk located on the northeast corner of the intersection of Richmond Street and Dorchester Avenue.
East 12.84′ from c. c. B. C. G.
Southwest 6.03′ from corner post wire fence.
Northwest 8.63′ from c. c. C. B.
Northwest 9.50′ from c. c. B. W.W.


ROXBURY, MASS.
STATION "BAPTIST"
TRANSFER TRIANGLE.
Penthouse
Faulkner
STATION "BAPTIST"
See Inset at right
PARKER HILL AVE.
SUNSET ST.
HILLSIDE ST.
FRAWLEY ST.
HUNTINGTON AVE.
KEMPTON ST.
PARKER HILL AVE.
Brick Chimney Corner
Ventilator
27.13
16.49
11.93
Faces at bottom of pipe
5.12
4.14
6.65
8.55
Metal Coping Corners
FRANCIS ST.
VILLA ST.
FENWOOD RD.
VILLA ST.
Base of Directional Sign
Cut on Sewer M.H. Cover
Cut on E.E.L.Co. M.H. Cover
RIVERWAY
Drill Hole Prop. Line Mon.
Pantex #25
Drill Hole in Stone Bd.
F40/0
9.96
8.40
Sign Post
MON. No. 26
F7/0
14.07
17.22
68.25
42'
BROOKLINE AVE.
CPB Disc
No Left Turn Post

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BAPTIST STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. DEARBORN YEAR: 1938 LOCALITY: ROXBURY

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.99 meters.
Height of telescope above station mark, 2.28 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Faulkner	3539.43		30 20 23.47
No Ref. Marks			
Ties Only			

Detailed Description:

A City Planning Board disc set in concrete pimple 4 inches above tar and gravel roof of the highest penthouse of the New England Baptist Hospital, Parker Hill, Roxbury, Mass. Visibility is excellent in all directions. Station is reached by taking Parker Hill Avenue from Huntington Avenue to hospital.

Special privileges were allowed the Boston City Planning Board in occupying this station by the hospital authorities.

Described by T. HOMKOWICZ Marked by.....

GROUND TRANSFER POINT, "BAPTIST" MONUMENT (BROOKLINE TOWN) (First order traverse point No. F40/0).

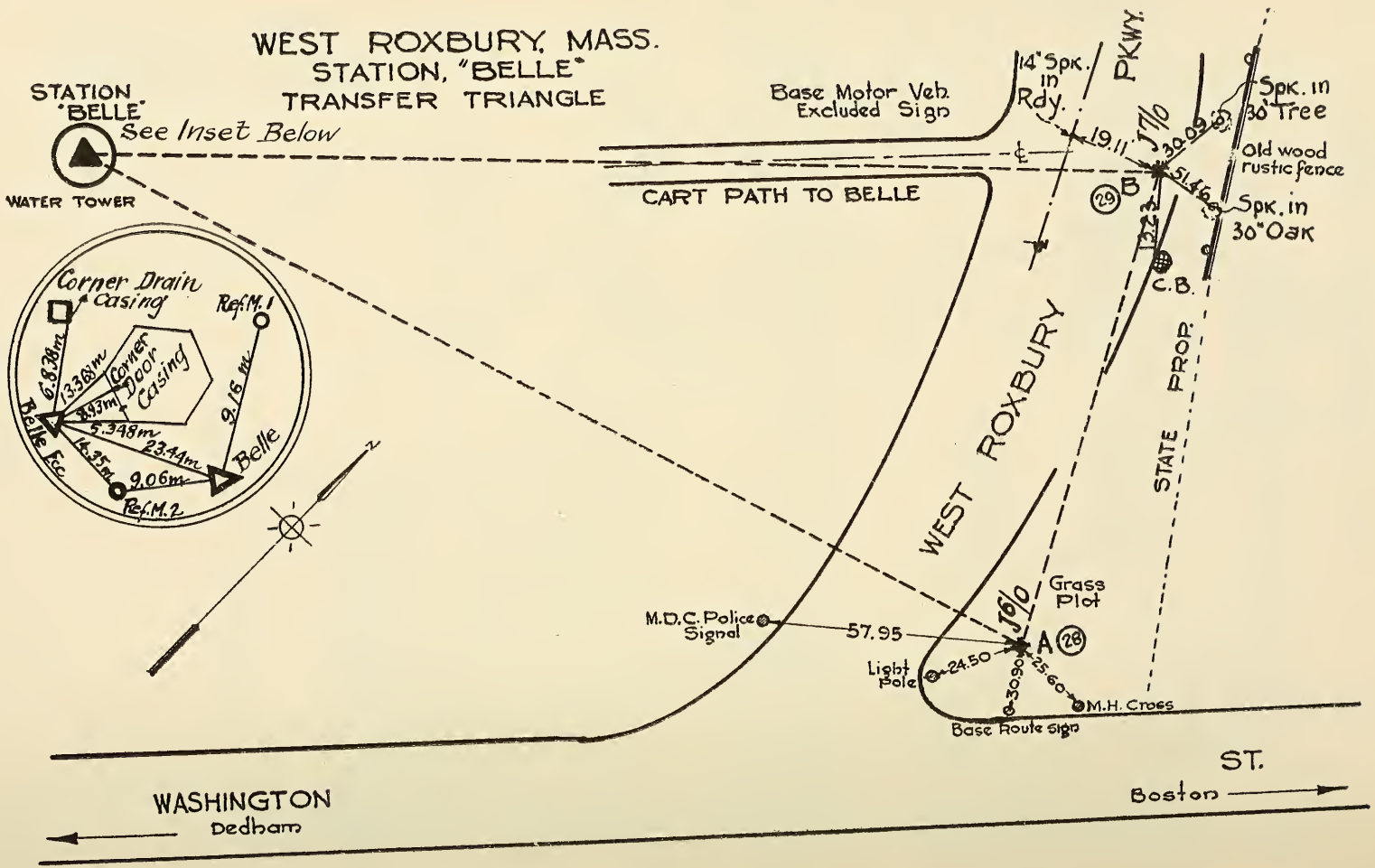
Description: This point consists of a Brookline town monument with drill hole, on the southeast corner of Brookline Avenue and Washington Street.

North 9.95′ from corner of Pantex Company Building.
East 8.40′ from c. c. on sign post.
South 9.96′ from the L. O. C. of Pantex Building.
Northeast 7.10′ from drill hole in stone bound.

GROUND TRANSFER POINT, "BAPTIST" MONUMENT No. 26 — (First order traverse point No. F7/0).

Description: This point consists of a C. P. B. disc located on the northwest corner of Brookline Avenue and Riverway, located as follows:

North 17.22′ from c. c. on E. E. I. M. H.
East 4.24′ from sign post "No Left Turn."
South 64.29′ from base of directional sign post
West 14.07′ from c. c. on M. H. cover.


WEST ROXBURY, MASS.
STATION, "BELLE"
TRANSFER TRIANGLE
STATION "BELLE"
See Inset Below
WATER TOWER
Base Motor Veh. Excluded Sign
14" Spk. in Rdy.
PKWY.
Spk. in 30" Tree
Old wood rustic fence
Spk. in 30" Oak
CART PATH TO BELLE
C.B.
WEST ROXBURY
STATE PROP.
Corner Drain Casing
Ref. M. 1
Corner Door Casing
Belle Fec.
Belle
Ref. M. 2
6.938m
13.38m
8.93m
5.348m
9.16m
23.44m
14.35m
9.06m
M.D.C. Police Signal
57.95
Grass Plot
Light Pole
24.50
30.90
25.60
M.H. Cross
Base Route sign
WASHINGTON
Dedham
ST.
Boston

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: BELLE
STATE: MASSACHUSETTS COUNTY: SUFFOLK
ESTABLISHED BY: K. T. ADAMS
YEAR: 1938 LOCALITY: BOSTON (West Roxbury)
RECOVERED BY:* J. M. DEARBORN
YEAR: 1938

Detailed statement as to the fitness of the original description:

Station Belle of the United States Coast and Geodetic Survey was incorporated into the Boston City Planning Board Main Triangulation Scheme in 1938 and its position was transferred to the ground by means of a transfer triangle whose base lies on the West Roxbury Parkway. The original description was checked and found to be correct. However, it was impossible to find R. M. No. 3 and the City station mentioned in the description due to recent landscaping and construction. It was found necessary to establish Station Belle Ecc. a lead plug and copper tack on the roof 23.44 meters west of the main station in order to clear lines blocked by the hexagonal structure. The station and eccentric was occupied directly with the instrument and legs.

J. M. DEARBORN.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BELLE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: K. T. ADAMS YEAR: 1933 LOCALITY: BOSTON

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, No. 3, Note, 11b
Reference mark, No. 1, Note, See No. 2, City below
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4 meters.
Height of telescope above station mark, 4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Blue Hill 1845		00 00 00	
R. M. No. 2	9.054	49 45 22	
Apex. Hex. Structure	15.524	98 06 57	
R. M. No. 1	9.156	147 29 36	
City Station	59.552	182 45 49	
R. M. No. 3	50.039	260 31 04	

Detailed Description: Station BELLE is a first order C. & G. S. station in the City of Boston. It is on the top of a water tank which is on the summit of Bellevue Hill, in the center of the West Roxbury district of the City of Boston. The tank is constructed in two sections, an inner and outer section. The inner section is a round sheet-iron standpipe about 100 feet in diameter and 45 feet high. The outer section is made of granite blocks set on the same foundation as the iron standpipe. This outer section is about 116 feet in diameter and 55 feet high, and it is used as a cover, both sides and top, for the inner section. On the top or roof of the outer section there is a hexagonal structure 36 feet on a side with a green terra cotta roof with a lightning rod rising from the center.

The station mark is a standard disc set into the top of a concrete dome cast on the asphalt covered reinforced concrete roof. It is on the east side of the roof and it is 1.39 meters from the inside of the parapet wall around the edge of the roof.

Three standard disc reference marks were established. They are stamped and situated as follows:

"BELLE NO. 1" — Set in the top of an 8-inch dome of concrete cast on the roof, to the south and west of the station mark.

"BELLE NO. 2" — Set in the top of an 8-inch dome of concrete cast on the roof, to the west of the station mark.

If the north side, or the side nearest the station mark, of the hexagonal housing on the roof were extended easterly and westerly, they would pass through the center of R. M. No. 1 and No. 2.

"BELLE NO. 3" — Set into the top of a concrete monument 12 inches in diameter at the top, 18 inches in diameter at the bottom and 42 inches long, buried so that the top is about level with the ground. It is about 5 meters south of a dirt road leading westerly up the hill to the tank.

A granite monument 6 inches square at the top, with a half-inch drill hole on the top as the mark of center and the letters "City" cut into the top was used as an additional reference mark. It is about northerly of the station and at the northerly edge of the top of the hill.

The 1933 observations were taken from a stand whose tripod head was about 1 meter above the station mark. The 1934 observations were taken from a stand whose tripod head was 3.44 meters above the station mark. The view is clear in all directions except from the south to the west where the hexagonal housing causes an obstruction.

The station is best reached from the intersection of the West Roxbury Parkway and Centre Street. Follow Centre Street 0.8 mile south to a road leading westerly up to the tank.

GROUND TRANSFER POINT, "BELLE" MONUMENT No. 28 — (First order traverse point No. J6/0).

Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the northerly corner at the intersection of Washington Street and West Roxbury Parkway.

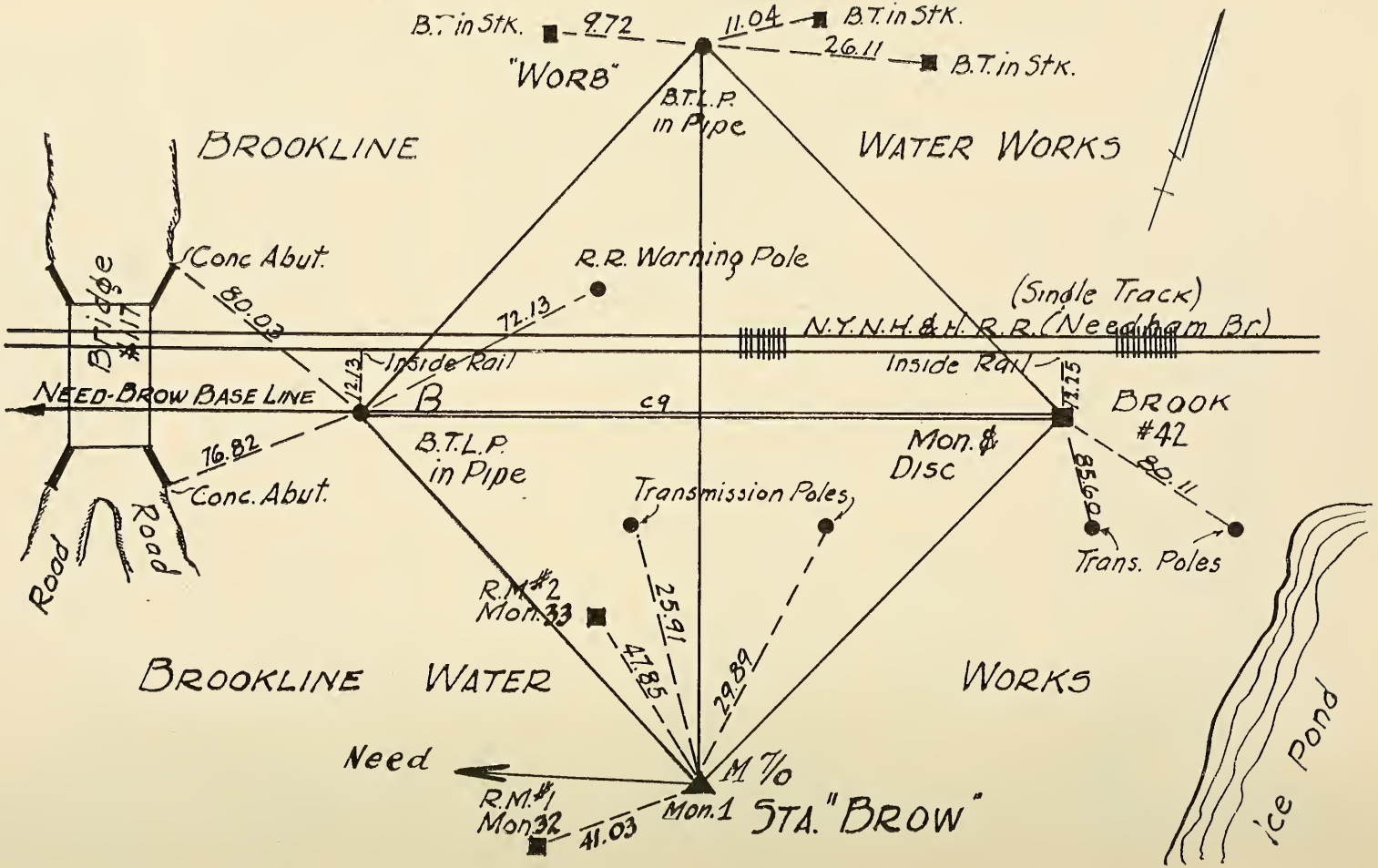
Northwest 25.60′ from c. c. M. H.
Northwest 30.90′ from the base of Route sign.
Northeast 24.50′ from light pole.
Northeast 57.95′ from M. D. C. police signal.

GROUND TRANSFER POINT, "BELLE" MONUMENT No. 29 — (First order traverse point No. J7/0).

Description: This point is a C. P. B. disc set in a concrete monument flush with the ground located on the easterly side of West Roxbury Parkway.

Northwest 13.23′ from catch-basin.
East 19.11′ from 14″ spk. in roadway, west side West Roxbury Parkway.
South 30.09′ from spk. in 30″ tree.
West 51.46′ from spk. in 30″ Oak.

Described by S. E. G. Marked by W. H. L.


B.T. in Stk.
9.72
11.04
B.T. in Stk.
26.11
B.T. in Stk.
"WORB"
B.T.L.P. in Pipe
BROOKLINE
WATER WORKS
Bridge
Conc Abut.
80.03
R.R. Warning Pole
(Sindle Track)
72.13
N.Y.N.H. & H. R.R. (Needham Br.)
Inside Rail
Inside Rail
NEED-BROW BASE LINE
12.13
B
c9
11.75
BROOK #42
B.T.L.P. in Pipe
Mon. & Disc
16.82
Conc. Abut.
85.69
80.11
Trans. Poles
Transmission Poles
Road
Road
R.M. #2 Mon. 33
25.91
47.85
29.89
BROOKLINE
WATER
WORKS
Need
M 7/0
R.M. #1 Mon. 32
41.03
Mon. 1
STA. "BROW"
Ice Pond

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BROW STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1 Note, 1a
Reference mark, No. 2 Note, 1a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 5.085 meters.
Height of telescope above station mark, 5.37 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Need	1952.09	0 00 00	80 12 16.70
Ref. Mark No. 1	12.504	300 55 22	21 07 38.70
Ref. Mark No. 2	14.591	41 45 08	121 57 24.70

Detailed Description:

A C. P. B. bronze disc set in a concrete monument, about 4 inches above the ground on the brow of a knoll along the Needham Branch of the N. Y., N. H. & H. RR. on the property of the Brookline Water Works. The station is located on the southern side of the railroad between an ice pond and railroad bridge No. 1.17 which crosses the railroad to the Brookline Water Works property on the North side of the railroad. The station is reached from the Veterans of Foreign Wars Parkway over Gardner Street, then making the first left turn over a gravel road Rivermoor Street to Pumping Station of the Brookline Water Works, then over their private gravel road to the station. A 15-foot tower was used and gives a view in all directions.

Described by J. BULLMAN Marked by.....

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BROOK STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: BROOKLINE

Surface-station mark, Note, 1a
Underground-station mark, Note, 7a
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.5 meters.
Height of telescope above station mark, 1.5 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

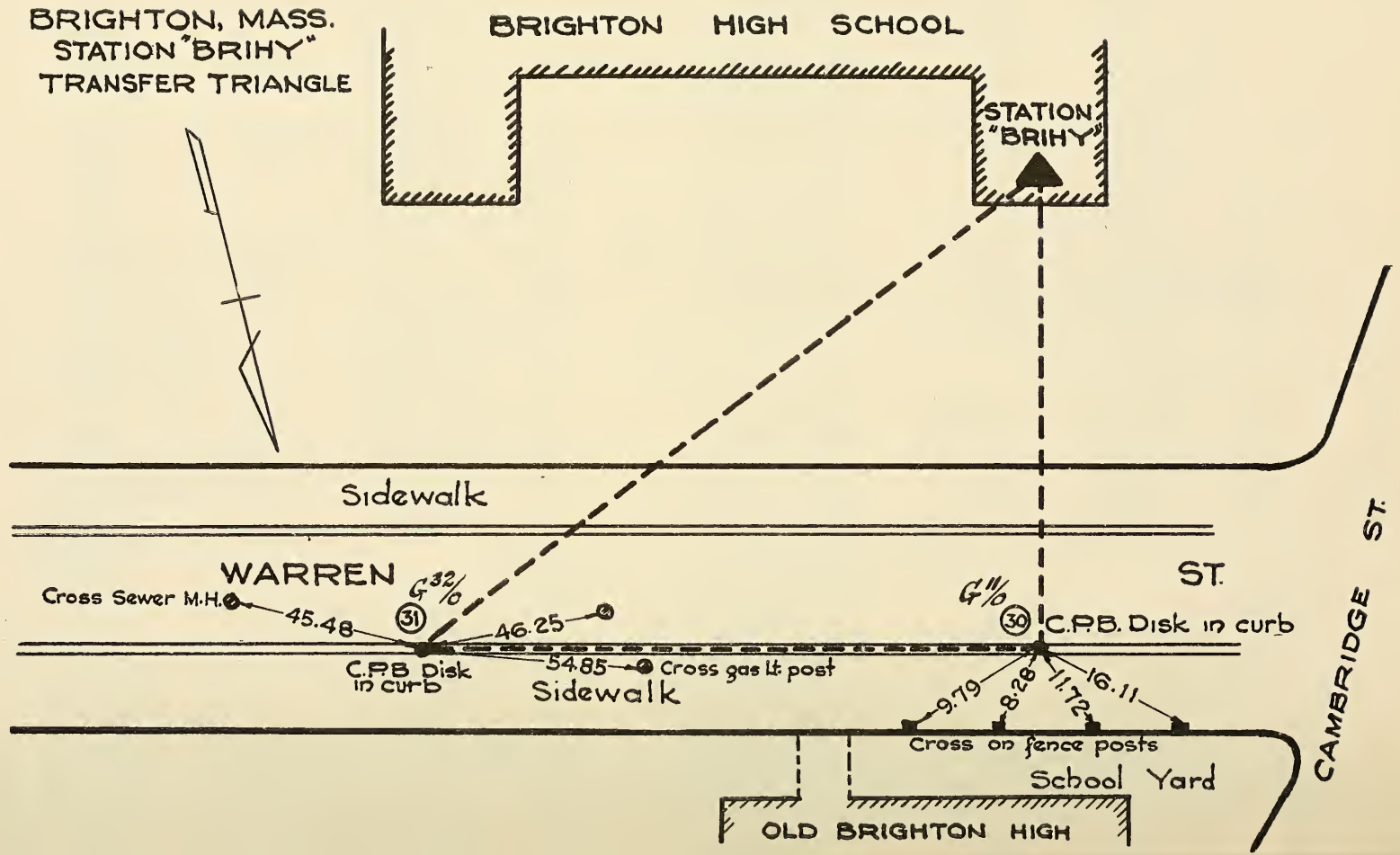
Object	Distance	Direction	Azimuth
		° ′ ′	° ′ ″
Brow	Meters	00 00 00	55 39 48
Ref. Mark No. 1 (Pt. "B")	121.036	24 32 35	80 12 23
Ref. Mark No. 1 is a pipe flush with gro	brass tack und.	in lead plug	set in a metal

Detailed Description:

Station Brook is the easterly end of ground base No. 4 situated on the Needham Branch of the N. Y., N. H. & H. RR. track, situated south of the Brookline Water Works, 12.25 feet south of the southerly rail; 80.105 feet northwest of transmission pole and 85.60 feet northwest of transmission pole.

Station is marked by a monument with a standard C. P. B. disc.

Described by H. ADELMAN Marked by.....


BRIGHTON, MASS.
STATION "BRIHY"
TRANSFER TRIANGLE
BRIGHTON HIGH SCHOOL
STATION "BRIHY"
Sidewalk
WARREN
ST.
Cross Sewer M.H.
45.48
G 32/0
31
46.25
C.P.B. Disk in curb
54.85
Cross gas lt. post
C.P.B. Disk in curb
Sidewalk
G 11/0
30
C.P.B. Disk in curb
9.79
8.28
11.72
16.11
Cross on fence posts
School Yard
OLD BRIGHTON HIGH
CAMBRIDGE ST.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BRIHY STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: THEODORE HOMKOWICZ YEAR: 1938 LOCALITY: BRIGHTON

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 1.99 meters.
Height of telescope above station mark, 2.28 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Corey	1277.48		306 43 39.50
No Ref. Marks			
Ties only			

Detailed Description:

A standard C. P. B. disc station mark set in a circular block of concrete on the highest part of the westerly side of the Brighton High School.

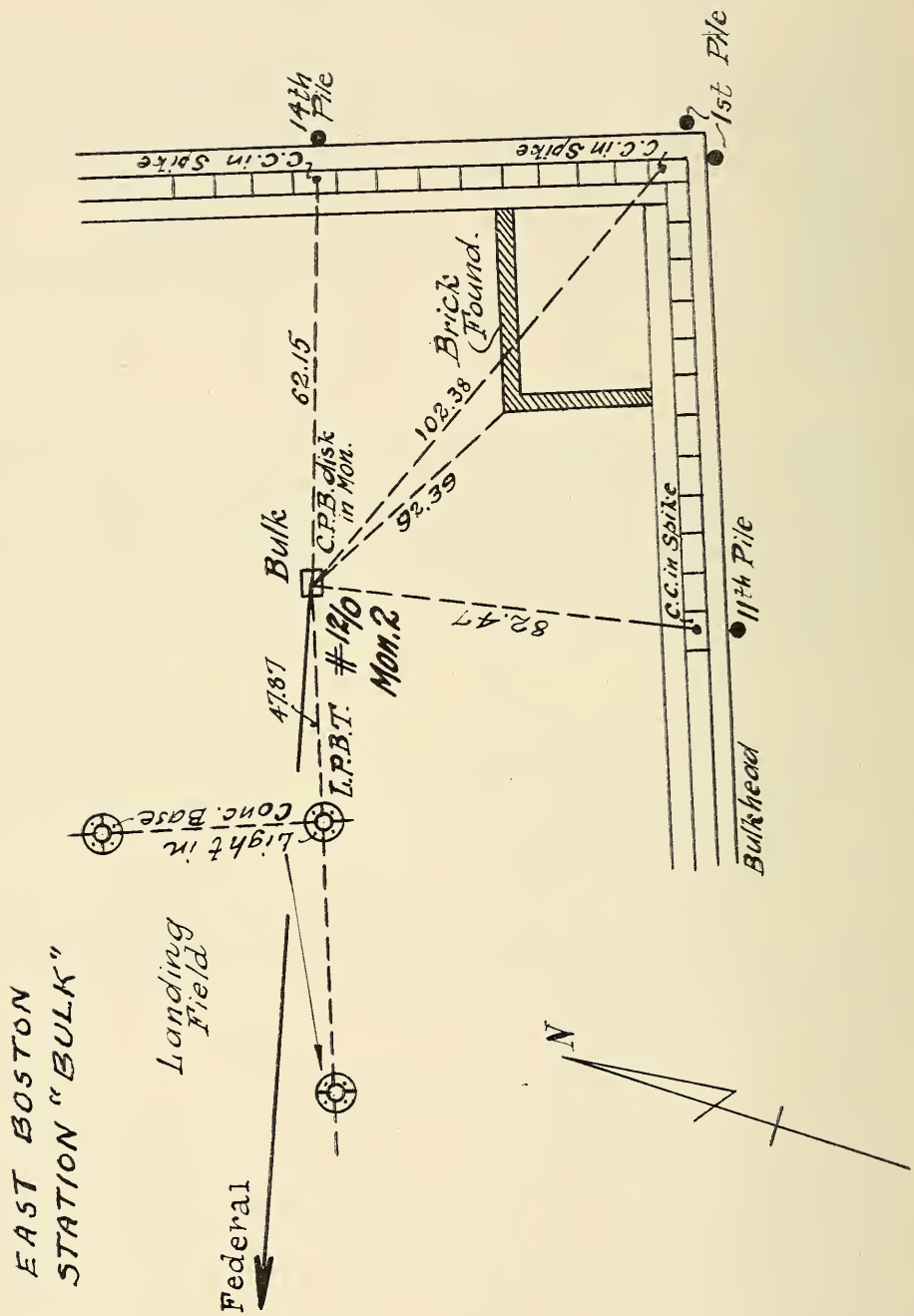
Located 12.20 feet southeast from the outside corner of the cement block of the northwest corner of the roof, and 11.15 feet southwest from the outside corner of the cement block of the northeast corner of the roof, and 20.14 feet northeast from the outside corner of the cement block of the southwest corner of the roof; and 18.95 feet, 15.33 feet, 14.06 feet, 16.49 feet northwest from four corners of a hexagonal tower on the southeast corner of the roof. The last four distances are taken clockwise or from south to east.

The visibility is good in the northerly quadrants but toward the south trees and houses make sighting less favorable.

Described by T. HOMKOWICZ Marked by.....

GROUND TRANSFER POINT, "BRIHY" C. P. B. DISC NO. 30 — (First order traverse No. G11/0).
Description: This point is a C. P. B. disc set in curb on the north side of Warren Street, near intersection with Nevins and Cambridge Streets.
South 16.11′ from c. c. on fence post.
South 11.72′ from c. c. on fence post.
Northwest 8.28′ from c. c. on fence post.
Northwest 9.79′ from c. c. on fence post.

GROUND TRANSFER POINT, "BRIHY" C. P. B. DISC No. 31 — (First order traverse point No. G32/0).
Description: This point is a C. P. B. disc set in curb on the north side of Warren Street.
Northwest 45.48′ from c. c. on sewer M. H.
East 46.25′ from c. c. on M. H.
Southeast 54.85′ from c. c. on gas lt. pole.


EAST BOSTON
STATION "BULK"
Landing Field
Federal
Light in Conc. Base
L.P.B.T.
#1/16
Mon. 2
47.87
Bulk
C.P.B. disk in Mon.
62.15
102.38
92.39
82.47
Brick Found.
C.C. in Spike
14th Pile
C.C. in Spike
1st Pile
11th Pile
Bulkhead
N

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BULK STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: H. ADELMAN YEAR: 1938 LOCALITY: EAST BOSTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.22 meters.
Height of telescope above station mark, 1.5 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Federal	3731.39		75 34 47.91
No Ref. Marks Ties only			

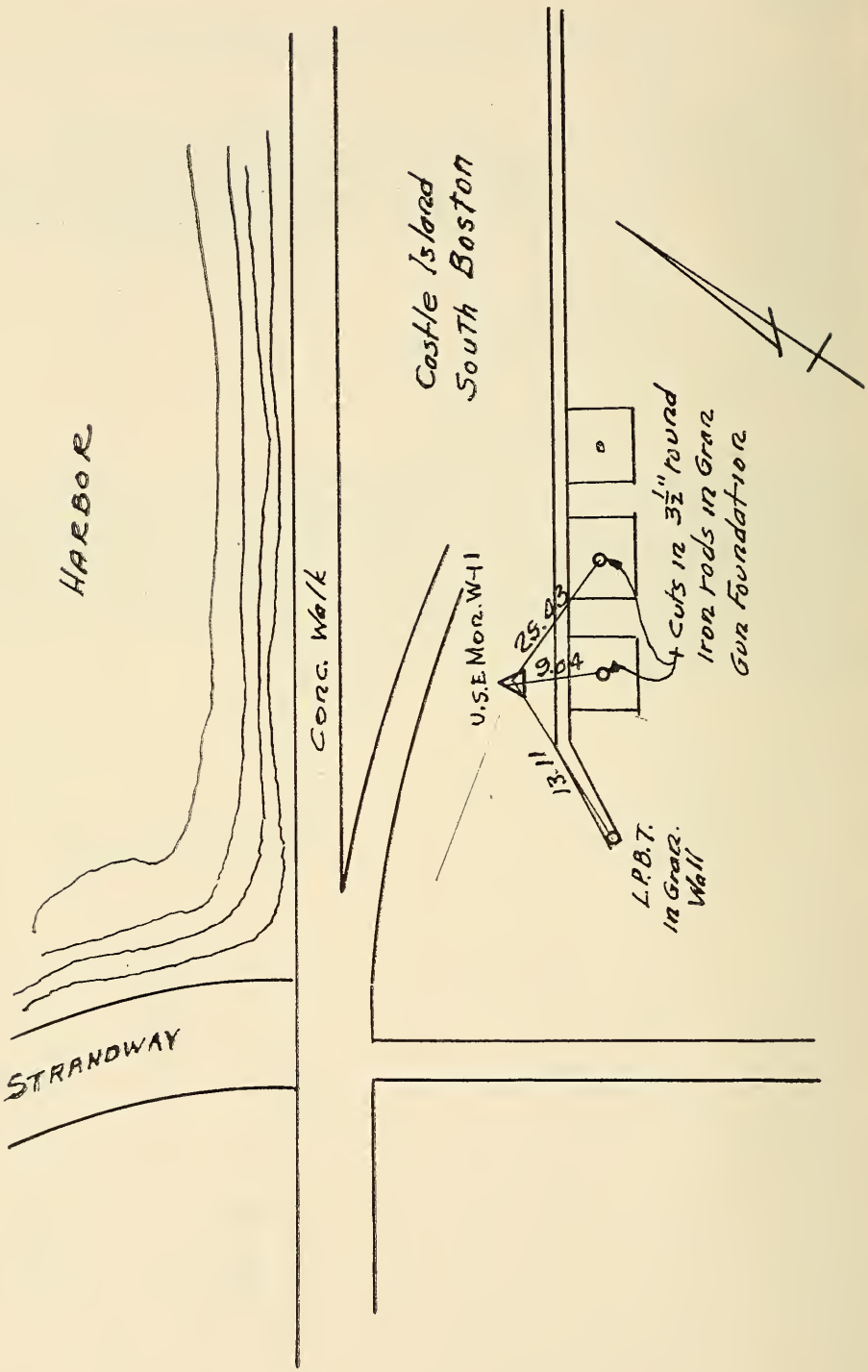
Detailed Description:

A C. P. B. disc set in a concrete monument flush with ground, situated at southeast corner of East Boston Airport. 47.87 feet east of L. P. B. T. in concrete base of field light at southeast corner of landing field; 62.15 feet west of (c. c.) spike in vertical timber in easterly side of bulkhead, opposite 14th pile from southeast corner; 102.38 feet northwest of (c. c.) spike in most outward vertical timber at southeast corner of Airport; 82.47 feet north of (c. c.) spike in vertical timber in southerly side of bulkhead, opposite 11th pile from southeast corner.

Visibility is good in all but the northerly direction where view is blocked by Orient Heights.

Station Bulk is also point No. 12/0, first order traverse.

Described by L. DEMODENA Marked by.....


HARBOR
CONC. WALK
Castle Island
South Boston
U.S.E. Mon. W-11
25.43
9.04
13.11
4 Cuts in 3½" round
Iron Rods in Gran
Gun Foundation
L.P.B.T.
in Gran.
Wall
STRANDWAY

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CASTLE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: SOUTH BOSTON

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters. Height of telescope above station mark, 3.8 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Sobig	2678.66	0 00 00	76 20 59.58
Ref. Mark No. 1	7.75	215 15 40	291 36 39.58
Ref. Mark No. 2	4.00	336 06 15	52 27 14.58

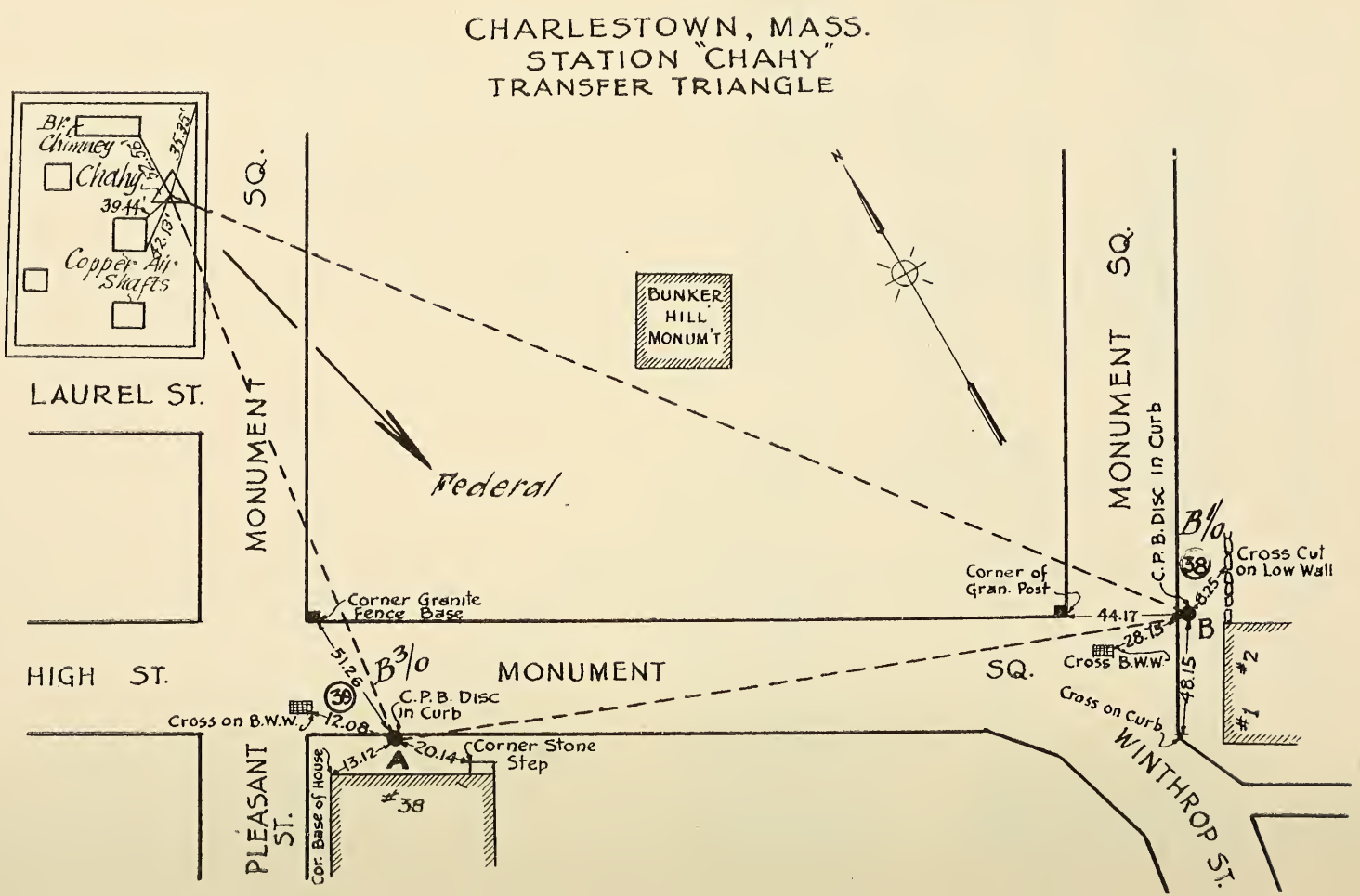
Note: Ref. Mark No. 1 is a punch mark in a round iron rod set in a granite gun foundation. Ref. Mark No. 2 is a brass tack in a lead plug in a drill hole in the southeastern corner of granite retaining wall.

Detailed Description:

A drill hole in U. S. E. Monument W–11 on the northwestern end of Castle Island in South Boston.

Located on the highest point of a promontory at the western end of a row of granite gun foundations; 25.43 feet west from Ref. Mark No. 1; 9.04 feet northwest from a similar gun foundation; and 13.11 feet north from a L. P. B. T. in the southeastern corner of the granite retaining wall.

Described by H. F. JOHNSON Marked by.....


CHARLESTOWN, MASS.
STATION "CHAHY"
TRANSFER TRIANGLE
Br. Chimney
Chahy
Copper Air Shafts
39.11'
35.32'
LAUREL ST.
MONUMENT SQ.
BUNKER HILL MONUM'T
Federal
MONUMENT SQ.
C.P.B. Disc in Curb
B 1/0
Cross Cut on Low Wall
Corner of Gran. Post
Corner Granite Fence Base
44.17
8.25
28.13
B
Cross B.W.W.
HIGH ST.
51.26
B 3/0
MONUMENT SQ.
48.15
#2
#1
Cross on B.W.W.
12.08
C.P.B. Disc in Curb
Cross on Curb
Corner Stone Step
13.12
20.14
A
WINTHROP ST.
PLEASANT ST.
Cor. Base of House
#38

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CHAHY
CHIEF OF PARTY: DEMODENA

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: CHARLESTOWN

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
No Ref. Marks Ties Only Federal	2220.82		350 35 43.98

Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 4 inches above a tar and gravel roof, one quarter of the way from northeast corner along the east side of the Charlestown high school, situated on the west side of Monument Square, south side of Bartlett Street, in Charlestown, Mass.

Described by LEO DEMODENA Marked by.....

GROUND TRANSFER POINT, "CHAHY", CPB DISC No. 39 — (First order traverse No. B3/0).

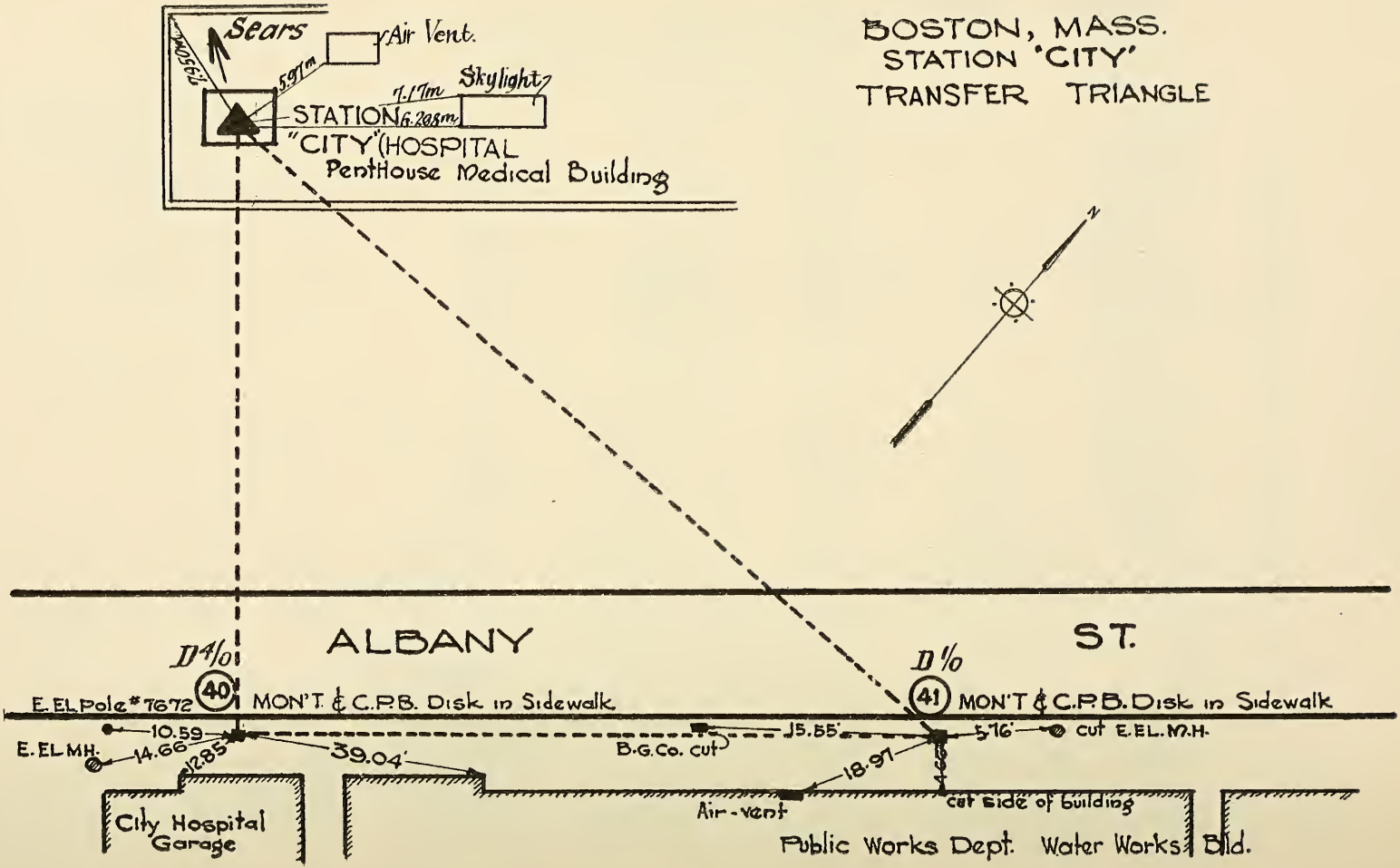
Description: This point consists of a C. P. B. disc set in curb on south side of Monument Square near Pleasant Street directly in front of house No. 38 on Monument Square.

South 51.26′ from corner granite fence base.
Northwest 20.14′ from corner stone step of No. 38.
West 13.12′ from corner base of house No. 38.
Southeast 12.08′ from c. c. on B. W. W.

GROUND TRANSFER POINT, "CHAHY", CPB DISC No. 38 — (First order Traverse No. B1/0).

Description: This point is a C. P. B. disc set in curb on east side of Monument Square directly in line with fence on south side of Monument Square near Winthrop Street.

Southeast 44.17′ from corner of granite post.
Southwest 8.25′ from c. c. on low wall.
Northeast 48.15′ from c. c. on curb.
East 28.75′ from c. c. on B. W. W.


BOSTON, MASS.
STATION "CITY"
TRANSFER TRIANGLE
Sears
Air Vent.
5.91m
7.17m
Skylight
STATION 6.208m
"CITY" HOSPITAL
Penthouse Medical Building
N
ALBANY
ST.
D 4/01
D 1/0
40
41
E. EL. Pole * 7672
MON'T. & C.P.B. Disk in Sidewalk
MON'T & C.P.B. Disk in Sidewalk
10.59
E. EL. M.H.
14.66
12.85
39.04'
B.G.Co. cut
15.55'
5.16'
cut E. EL. M.H.
18.97
Air-vent
cut side of building
City Hospital Garage
Public Works Dept. Water Works Bld.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CITY STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: DEMODENA YEAR: 1938 LOCALITY: BOSTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.744 meters.
Height of telescope above station mark, 2.034 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Sears	2619.48		113 06 27.02
No Ref. Marks, only ties			

Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 4 inches above a tar and gravel roof, at the southeast corner of the Medical Building of the Boston City Hospital, situated on the east side of Harrison Avenue, north side of Massachusetts Avenue and Albany Street. This position is on the highest part of roof.

Described by LEO DEMODENA Marked by.....

GROUND TRANSFER POINT, "CITY", MONUMENT No. 40 — (First order traverse point No. D4/0).

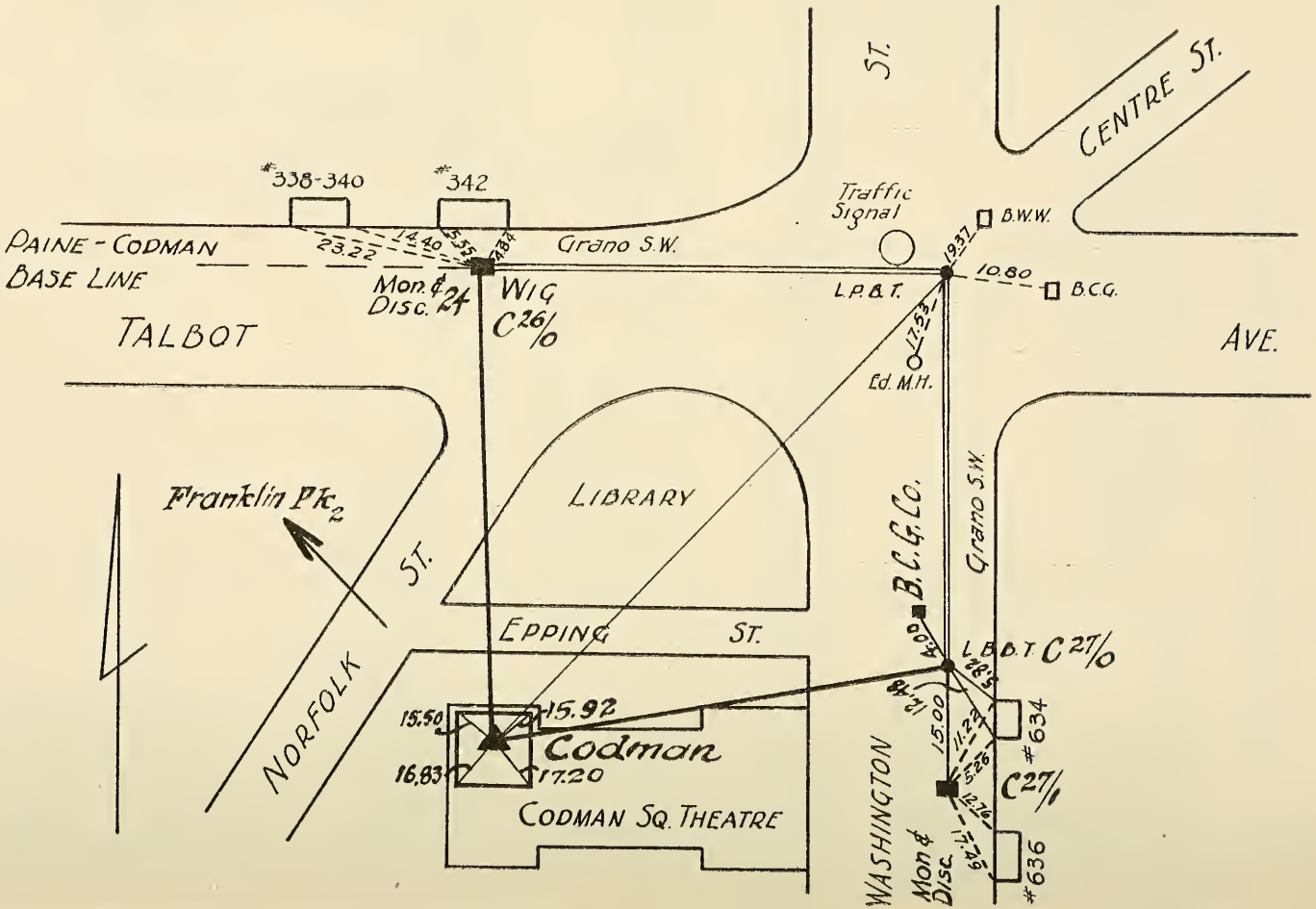
Description: This point is located near the City of Boston Ambulance Station and consists of a concrete monument with a C. P. B. disc set flush with concrete sidewalk.

North 14.66′ from c. c. on rim of E. E. I. M. H.
Northeast 10.59′ from E. E. I. pole No. 7672.
Northwest 12.85′ from R. O. C. of entrance to Mallory Institute.
South 39.04′ from corner of Water Works Building.

GROUND TRANSFER POINT, "CITY", MONUMENT No. 41 — (First order traverse point No. D1/0).

Description: This point consists of a C. P. B. disc set in a concrete monument flush with the concrete sidewalk near the Water Works Building on Albany Street.

North 18.97′ from air vent in building.
Northeast 15.55′ from c. c. on B. G. Co.
South 5.76′ from c. c. on E. E. I. M. H. rim.
West 4.66′ from c. c. on side of P. W. D. W. W. Building.


ST.
CENTRE ST.
#338-340
#342
Traffic Signal
B.W.W.
PAINE - CODMAN
BASE LINE
23.22
14.40
5.55
4.38
Grano S.W.
19.37
10.80
B.C.G.
Mon. & Disc. 24
WIG
C26/0
L.P.B.T.
17.53
TALBOT
AVE.
Ed. M.H.
Franklin Pk.
LIBRARY
ST.
B.C.G.Co.
Grano S.W.
EPPING
ST.
4.00
L.B.D.T C27/0
NORFOLK
15.50
15.92
16.83
17.20
Codman
CODMAN SQ. THEATRE
15.00
#634
C27/1
WASHINGTON
Mon. & Disc.
#636

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CODMAN STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Franklin Pk2	1830.16		144 44 33.39
No Ref. Marks Ties only			

Detailed Description:

A bronze City Planning Board disc, set in a concrete pimple 3 inches above the tar and gravel roof of the penthouse at the northwesterly end of the building which houses the fan equipment for the Codman Square Theatre. The station is on the highest roof and is reached over the fire escape in the parking area. The theater is located on Washington Street, Dorchester, just south of Codman Square.

The view is good in all directions.

Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "CODMAN" "WIG" MONUMENT No. 24— (First order traverse point No. C26/0).

Description: This point is a C. P. B. disc set in a concrete monument, the top of which is flush with the sidewalk, situated on the northerly side of Talbot Avenue, approximately 10 feet west of the P. C. of the curve leading into Codman Square and located approximately at the middle of the doorway leading into the Wigwam restaurant. Station occupied from the ground. This position is at the easterly end of Talbot base No. 5. (Paine-Codman.) Position elevated to station Codman.

Southeast 23.22′ from west outer edge of store front No. 338 Talbot Avenue.
Southeast 14.40′ from east outer edge of store front No. 340 Talbot Avenue.
Southeast 5.55′ from west outer edge of Wigwam restaurant.
Southwest 4.84′ from east outer edge of Wigwam restaurant.

GROUND TRANSFER POINT, "CODMAN" L. P. B. T. PT "B".

Description: This point is a L. P. B. T. located at the intersection of Washington Street and Talbot Avenue east of the traffic safety island.

Northeast 17.53′ from E. E. I. M. H.
West 10.80′ from c. c. on rim of B. G. Co. drip.
Southwest 19.37′ from c. c. on B. W. W.

GROUND TRANSFER POINT, "CODMAN" L. P. B. T.— (First order traverse point No. C27/0).

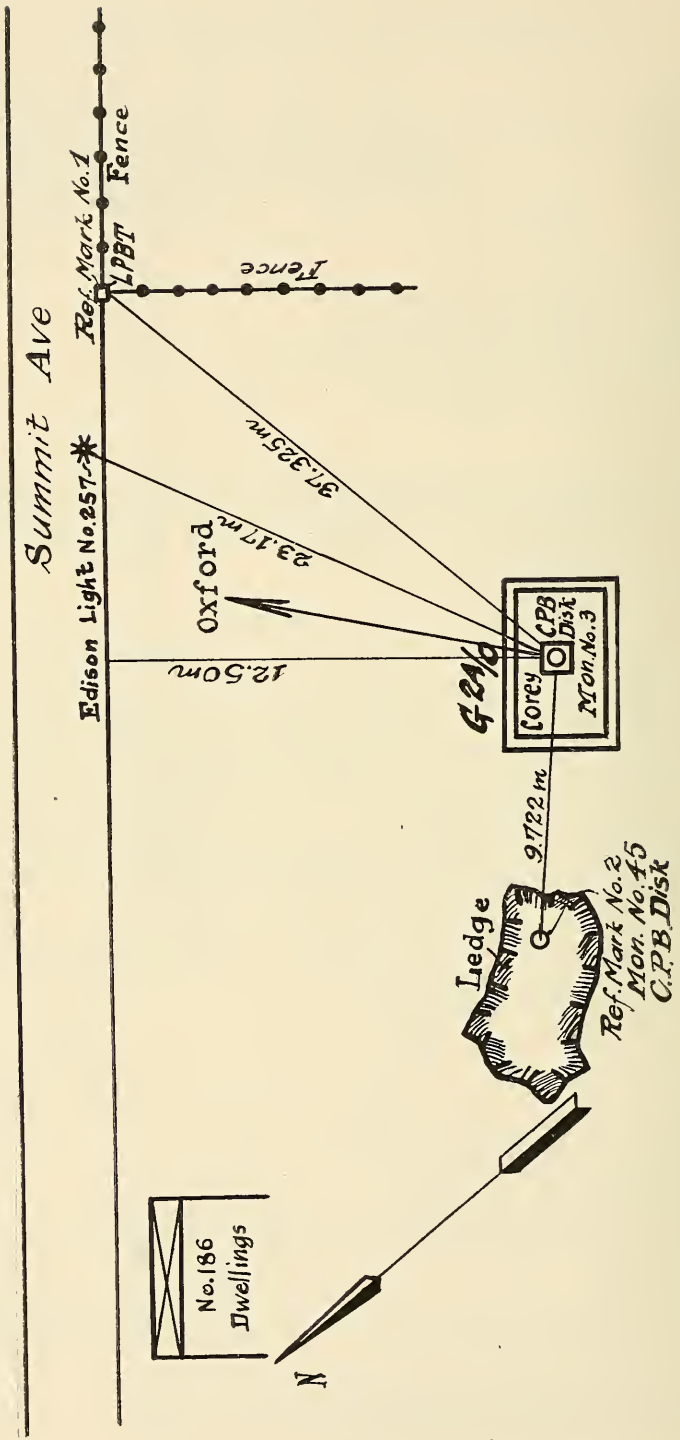
Description: This point is a L. P. B. T. set flush with the sidewalk located on the northeast side of Washington Street opposite No. 634.

North 15.00′ from Monument No. Trav. Pt. C27/1.
Southeast 4.00′ from B. C. G. Co. drip.
Northwest 5.82′ from left outer edge vitreous glass store front No. 634.
Northwest 12.48′ from right outer edge vitreous glass store front No. 634.

GROUND TRANSFER POINT, "CODMAN" MONUMENT No. — (First order traverse point No. C27/1).

Description: This point is a C. P. B. disc set in a monument flush with the concrete sidewalk located on the northeast side of Washington Street opposite No. 634 and No. 636 Washington Street.

Southwest 11.22′ from left outer edge of glass store front No. 634.
Southwest 5.26′ from right outer edge of glass store front No. 634.
Northeast 12.76′ from left outer edge of glass store front No. 636.
Northwest 17.49′ from right outer edge of glass store front No. 636.


Summit Ave
Ref. Mark No. 1
Fence
LPBT
Fence
Edison Light No. 257
31.325m
23.17m
Oxford
12.50m
Corey
CPB Disk
Mon. No. 3
9.722m
Ledge
Ref. Mark No. 2
Mon. No. 5
C.P.B. Disk
No. 186
Dwellings
N

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: COREY
CHIEF OF PARTY: DEMODENA

STATE: MASSACHUSETTS COUNTY: NORFOLK
YEAR: 1938 LOCALITY: BROOKLINE

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1, Note *
Reference mark, No. 2, Note, 12a
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 6.30 meters.
Height of telescope above station mark, 6.59 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Oxford	1822.92	00 00 00	235 51 35.96
Ref. Mark No. 1	37.325	29 46 32	265 38 07.96
Ref. Mark No. 2	9.722	236 42 07	114 33 42.96

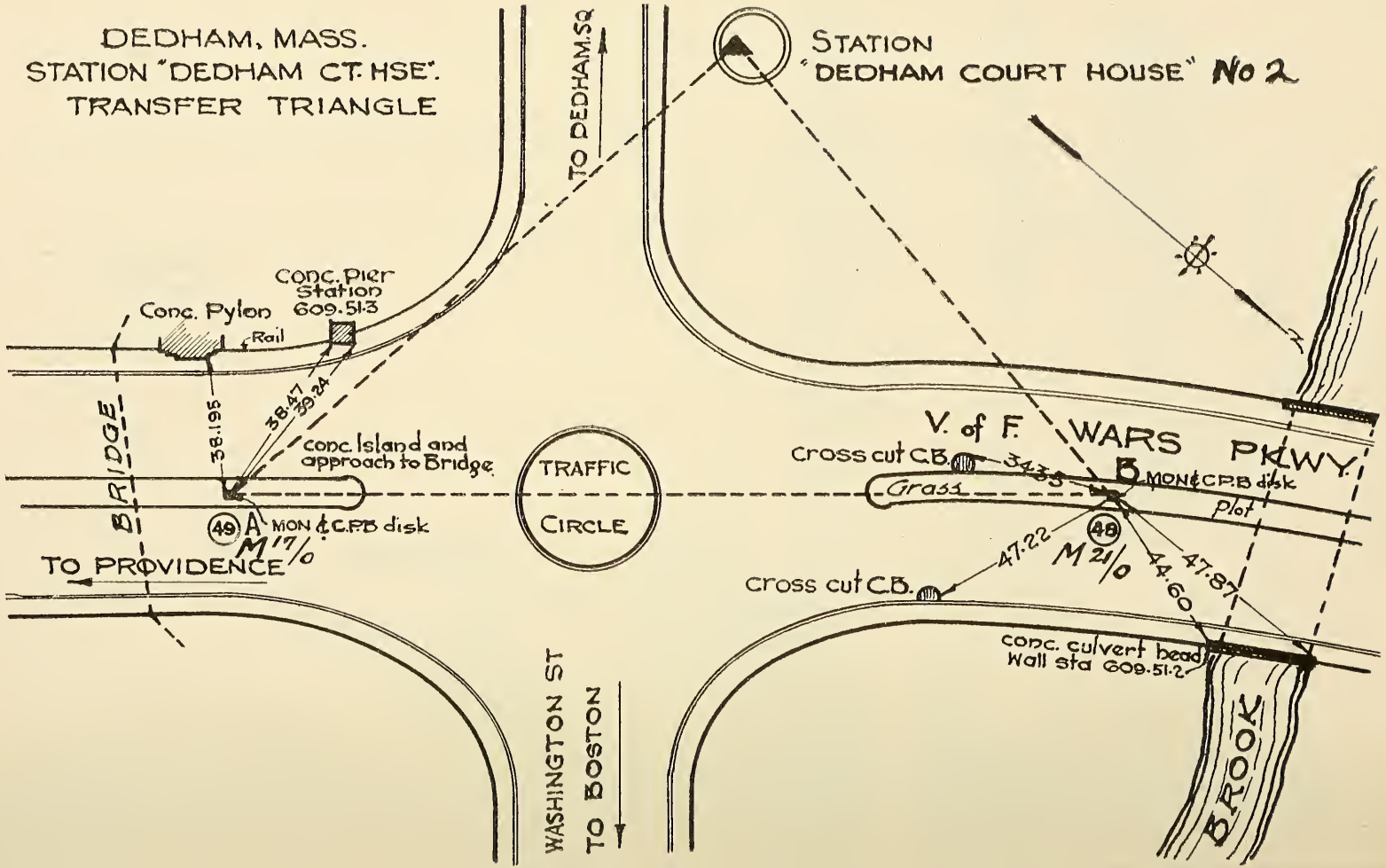
* Property monument at Summit Avenue.

Detailed Description:

A standard C. P. B. disc set in a concrete monument which is flush with the ground, about 12.50 meters south of a property line on Summit Avenue. Located approximately on the summit of Corey Hill. Southeast of house No. 186, Summit Avenue. Located 23.17 meters southwest of Edison Light No. 257.

Described by DEMODENA

Marked by.....


DEDHAM, MASS.
STATION "DEDHAM CT. HSE".
TRANSFER TRIANGLE
TO DEDHAM SQ
STATION
"DEDHAM COURT HOUSE" No 2
Conc. Pier
Station
609.51.3
Conc. Pylon
Rail
38.47
39.24
38.195
BRIDGE
conc. Island and
approach to Bridge
TRAFFIC
CIRCLE
V. of F. WARS PKWY.
cross cut C.B.
34.35
B
MON & C.P.B disk
Grass
plot
49
A
MON & C.P.B disk
M 17/0
TO PROVIDENCE
48
M 21/0
47.22
44.60
47.87
cross cut C.B.
conc. culvert head
Wall sta 609.51.2
WASHINGTON ST
TO BOSTON
BROOK

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: DEDHAM COURT HOUSE STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1935 LOCALITY: DEDHAM

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
	Feet	° ′ ″	° ′ ″
Harding Terrace	8235.44	0 00 00.0	271 57 58.1
Dedham Island	7272.68	252 49 17.4	164 47 15.5
Belle	13185.00	309 49 06.1	221 47 04.2
Blue Hill	21435.34	36 12 27.5	308 10 25.6
M128P	7295.86	99 26 38.5	11 24 36.6
Fisher	18890.26	101 32 59.8	13 30 57.9

Detailed Description: Base of flag pole at center of flat, circular dome over north center of granite building on the south side of High Street between Ames and Pearl Streets, in the center of the town.

U. S. C. and G. S. Recovery Note for Dedham Court House, 1885, by K. T. Adams, 1933, says that the building was rebuilt in 1894 but the center of the dome is supposed to be in the original position determined by C. H. Van Orden in 1885, listed in Sp. Pub. 76, p. 122, line 12. In 1935 the position of the present flag pole was determined by the Massachusetts Geodetic Survey.

Latitude 42 14 54.952 X = 687,548.77
Longitude 71 10 35.944 Y = 465,150.26

Described by A. BURTON Marked by.....

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: DEDHAM COURT HOUSE STATE: MASSACHUSETTS COUNTY: NORFOLK
ESTABLISHED BY: A. BURTON YEAR: 1935 LOCALITY: DEDHAM
RECOVERED BY:* J. M. DEARBORN YEAR: 1938

Detailed statement as to the fitness of the original description:

This station was incorporated into the main Triangulation Scheme of the Boston City Planning Board. The position of the flag pole was not determined as mentioned in the original description, but a point scratched on the copper roof east of the flag pole and marked "Ecc." was used without reference to previous work. This cross was replaced by a copper tack and tied in as shown on the accompanying sketch.

Visibility at this station is excellent in all directions.

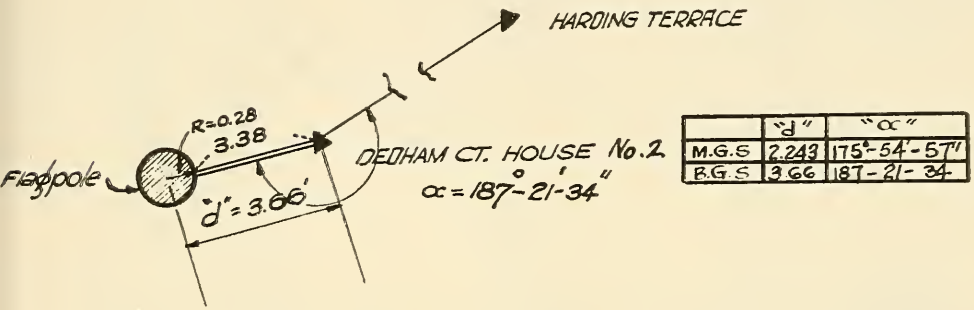
J. M. DEARBORN

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

The reconnaissance engineer found a cross cut on the roof of the Dedham Court House and placed a surveyor's tack in it. This position was occupied and pointed to in the Boston Triangulation net as Dedham Court House No. 2.

This position was tied in at a later date with the flag pole as a center and the eccentric distance of 3.66′ and an alpha angle of 187°-21′-34″ does not conform with the M. G. S. description of 2.243′ and 175°-54′-57″.



GROUND TRANSFER POINT, "DEDHAM COURT HOUSE" 2 MONUMENT No. 49 — (First order traverse point No. M17/0).

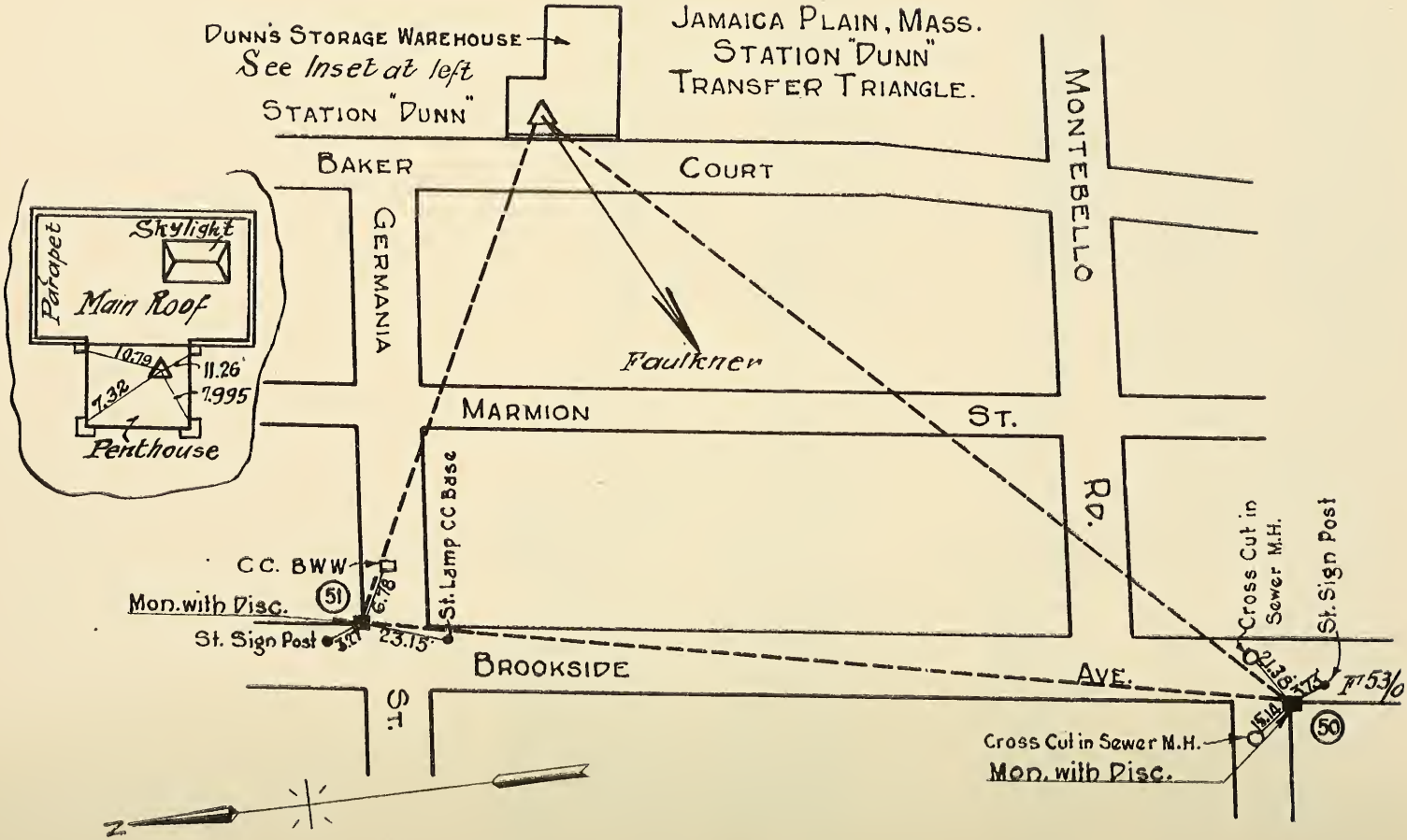
Description: This point is a C. P. B. disc set in a concrete monument flush with concrete reservation of overpass, located on the northerly end of the Dedham overpass on the Veterans of Foreign Wars Parkway, about 300 feet south of the intersection of Washington Street.

Northeast 38.195′ from con. pylon.
Northeast 38.47′ from con. pier sta. 609.51.3.
Northeast 39.24′ from con. pier sta. 609.51.3.

GROUND TRANSFER POINT, "DEDHAM COURT HOUSE" 2 MONUMENT No. 48 — (First order traverse point No. M21/0).

Description: This point is a C. P. B. disc in a concrete monument set flush with the ground in the grass plot in the island of the Veterans of Foreign Wars Parkway northwest of the intersection with Washington Street.

South 47.87′ from north end con. culvert head.
South 44.60′ from south end con. culvert head.
Northwest 47.22′ from c. c. catch-basin.
North 34.35′ from c. c. catch-basin.


Dunn's Storage Warehouse
See Inset at left
Station "Dunn"
Jamaica Plain, Mass.
Station "Dunn"
Transfer Triangle.
Baker
Court
Montebello
Germania
Parapet
Skylight
Main Roof
10.79
11.26
7.995
7.32
Penthouse
Faulkner
Marmion
St.
Rd.
St. Lamp CC Base
CC. BWW
Mon. with Disc.
51
St. Sign Post
23.15
Brookside
Ave.
St.
Cross Cut in Sewer M.H.
St. Sign Post
Cross Cut in Sewer M.H.
Mon. with Disc.
50
N

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: DUNN
CHIEF OF PARTY: DEARBORN

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: ROXBURY

Surface-station mark, Note, 1a
Under ground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Faulkner No Ref. Marks only ties	2659.09		62 10 00.20

Detailed Description:

A bronze City Planning Board disc set in a concrete pimple 4 inches above a tar and gravel roof of the highest penthouse of the Dunn Storage Warehouse, 3175 Washington Street, Roxbury, Massachusetts, between Egleston Square and Green Street. Visibility is good in all but the easterly quadrant, where view is blocked by the tall trees and ledge of Franklin Park.

Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT, "DUNN" MONUMENT No. 50 — (First order traverse point No. F53/0).

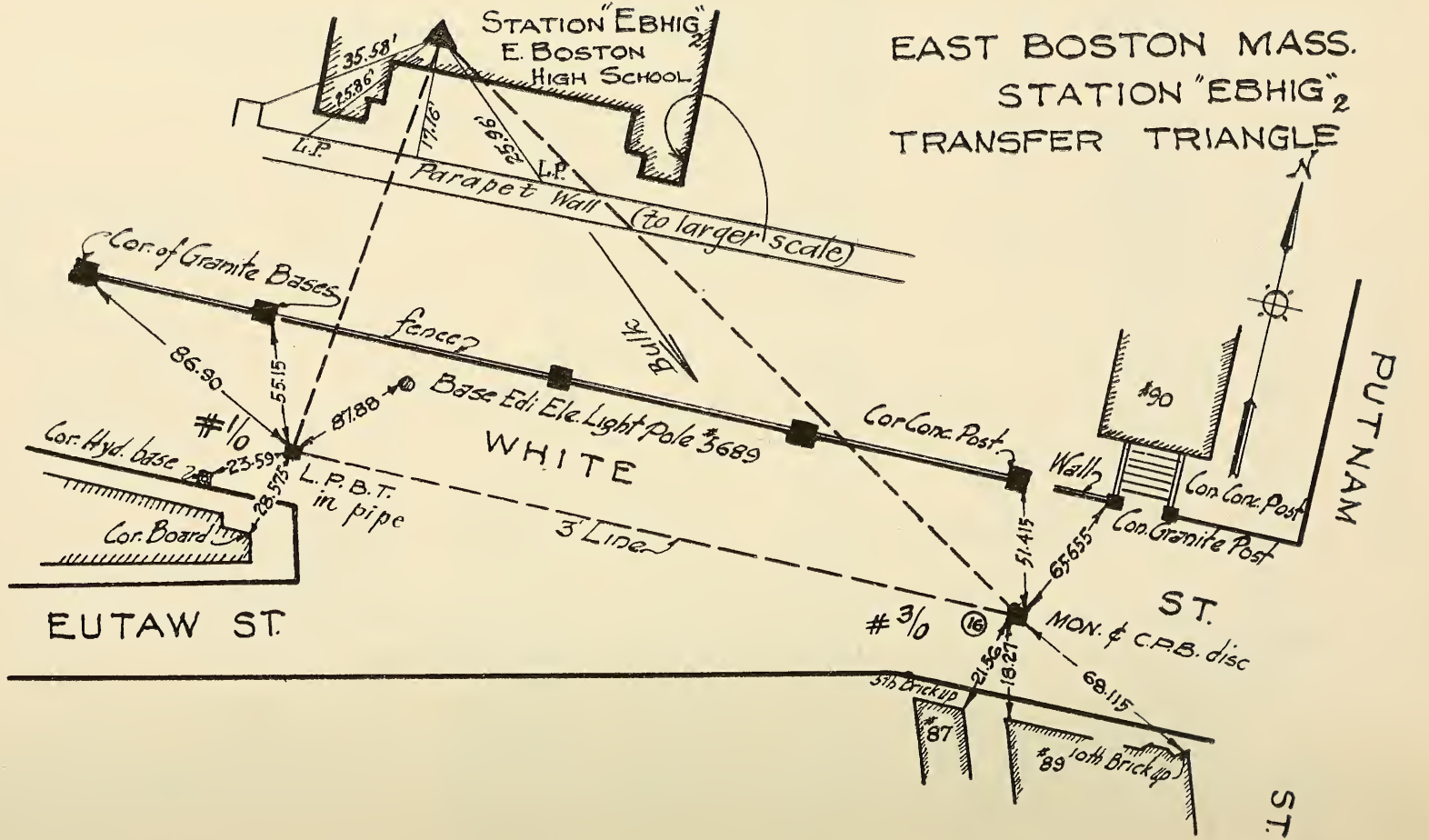
Description: This point consists of a C. P. B. disc and monument set in the southwest corner of Minton Street and Brookside Avenue.

Northwest 3.73′ from c. c. on sign post.
Southwest 21.38′ from c. c. on sewer M. H.
Southeast 15.14′ from c. c. on sewer M. H.

GROUND TRANSFER POINT, "DUNN" MONUMENT No. 51—

Description: This point consists of a C. P. B. disc and monument set in the northeast corner of Germania Street and Brookside Avenue.

North 23.15′ from c. c. on base of street lamp.
Southeast 3.27′ from street sign post.
Northwest 6.78′ from c. c. B. W. W.


EAST BOSTON MASS.
STATION "EBHIG" 2
TRANSFER TRIANGLE
STATION "EBHIG" 2
E. BOSTON
HIGH SCHOOL
35.58'
25.86'
17.16'
25.52'
L.P.
L.P.
Parapet Wall (to larger scale)
Cor. of Granite Bases
fence?
Bldg.
86.90
55.15
87.88
Base Ed. Ele. Light Pole #3689
#1/0
Cor. Hyd. base
23.59
28.57
L.P.B.T. in pipe
Cor. Board
WHITE
Cor Conc. Post
3' Line
EUTAW ST.
#3/0
MON. & C.P.B. disc
51.415
65.655
Con. Conc. Post
Con. Granite Post
Wall
#90
PUTNAM
ST.
21.56
18.27
68.115
31th Brick up
#87
#89 10th Brick up
ST.
N

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: EBHIG NO. 2 STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: ADELMAN YEAR: 1937 LOCALITY: EAST BOSTON

Surface-station mark, Note, See below
Under ground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.50 meters.
Height of telescope above station mark, 2.79 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
No Ref. Marks Ties only			
Bulk	2453.31		313 32 52.95

Detailed Description:

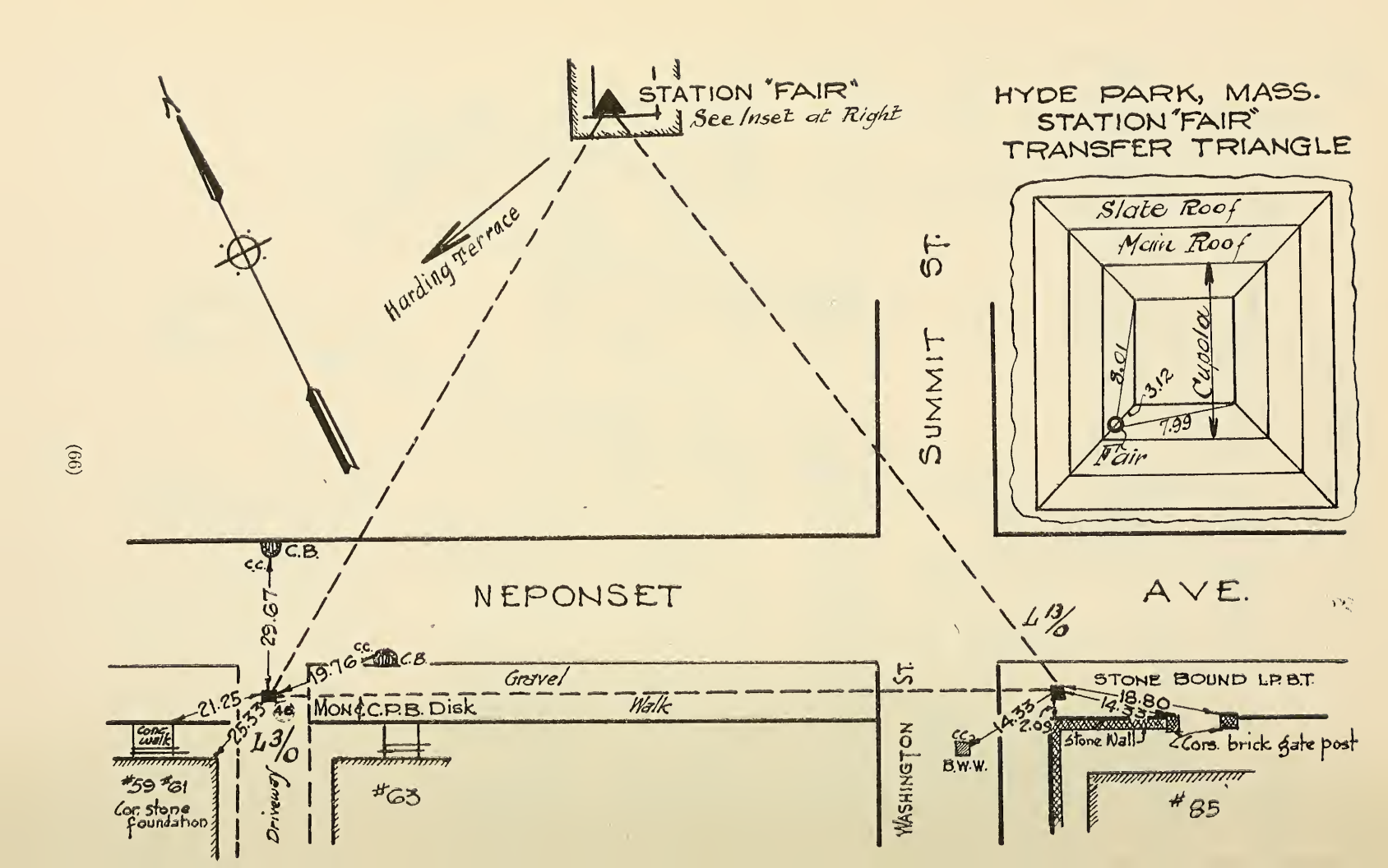
A copper tack in lead plug set flush in concrete skylight base on southeast of roof of the East Boston High School situated on White Street.

Located 17.16 feet north of parapet wall facing White Street, 25.86 feet northeast and 25.96 feet northwest of copper tacks in lead plugs set in face of parapet wall.

Described by ADELMAN Marked by.....

GROUND TRANSFER POINT, "EBHIG 2" MONUMENT No. 16 — (First order traverse No. 3/0).
This point is a C. P. B. disc set in Mon. on White Street.
Southwest 65.65′ from corner con. post.
South 51.41′ from corner con. post.
Northeasterly 21.56′ from 5th brick up on No. 87 White Street.
Northwesterly 18.27′ from R. O. C. of No. 89 White Street.
West 68.11′ from 10th brick of No. 89 White Street.

GROUND TRANSFER POINT, "EBHIG 2" L. P. B. T.— (First order traverse No. 1/0).
Description: This point consists of a L. P. B. T. in pipe on 3 feet offset line on south side of White Street, near intersection of White Street and Eutaw Street.
Southeast 86.90′ from corner of granite base.
Southeast 55.15′ from corner of granite base.
Southwest 87.88′ from base of E. E. I. Co. light pole No. 5689.
North 28.575′ from corner board.
Northeast 23.59′ from corner hydrant base.


STATION "FAIR"
See Inset at Right
HYDE PARK, MASS.
STATION "FAIR"
TRANSFER TRIANGLE
Slate Roof
Main Roof
Cupola
8.01
3.12
7.99
Fair
Harding Terrace
SUMMIT ST.
NEPONSET
AVE.
C.B.
c.c.
29.67
19.76
c.c.
C.B.
Gravel
Walk
MON. & C.P.B. Disk
21.25
25.33
46
Conc. walk
L 3/0
L 13/0
#59 #61
Cor. stone foundation
Driveway
#63
WASHINGTON ST.
STONE BOUND L.P.B.T.
18.80
14.33
14.35
2.09
c.c.
B.W.W.
Stone Wall
2 Cors. brick gate post
#85

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FAIR STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: HYDE PARK

Surface-station mark, Note, Brass Tack
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Harding Ter. No Ref. Marks Ties only	2363.39		89 04 45.50

Detailed Description:

A brass tack set in the westerly ridge of the cupola roof of the Fairmount School at Summit and Pond Streets in Hyde Park, Mass.

Visibility is good in all but an easterly direction where the view is obstructed by the hill upon which the school stands. In the Boston network it was necessary to erect a 16-foot signal in order to clear the line to Dedham Court House because of trees.

Station is best reached by taking Fairmount Avenue from River Street, Hyde Park, to Pond Street, and thus to school.

Described by J. MAGUIRE Marked by.....

GROUND TRANSFER POINT, "FAIR" MONUMENT No. 46 — (First order traverse point No. L3/0).

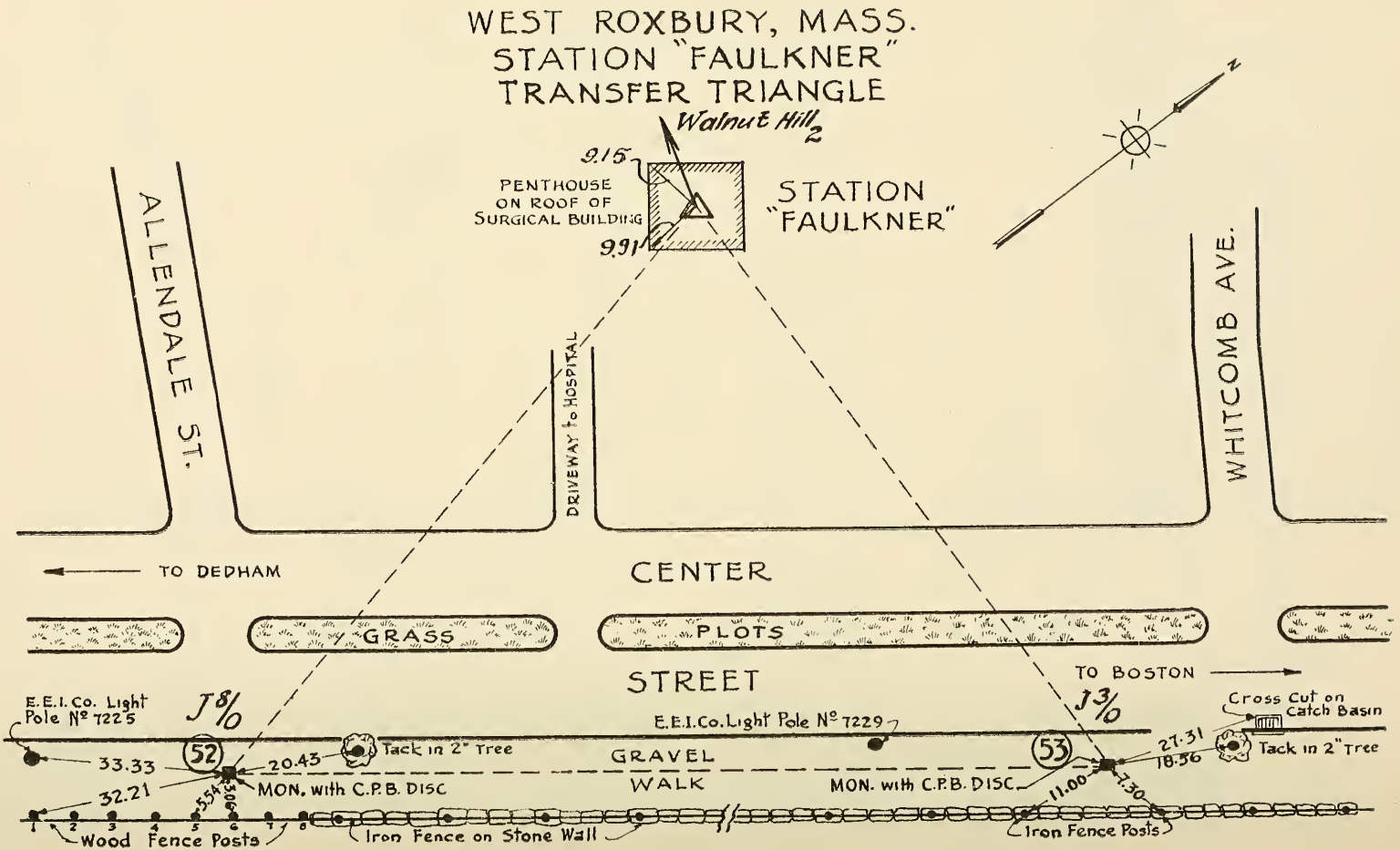
Description: This point is a C. P. B. disc set in a concrete monument the top of which is flush with the gravel sidewalk, located on the southwest side of Neponset Avenue about 250 feet south of Loring Street and between dwellings Nos. 61 and 63 Neponset Avenue.

Southwest 29.67′ from c. c. on catch-basin.
West 19.76′ from c. c. on catch-basin.
Northeast 25.33′ from corner stone foundation of 59–61.
East 21.25′ from corner concrete walk.

GROUND TRANSFER POINT, "FAIR" L. P. B. T. STONE BOUND — (First order traverse point No. L13/0).

Description: This point is a B. T. L. P. in stone bound the top of which is flush with dirt sidewalk, located at the southwest corner of Summit Street and Neponset Avenue and opposite No. 85 Neponset Avenue.

East 14.33′ from c. c. B. W. W.
Northwest 18.80′ from corner brick gate post.
Northwest 14.33′ from corner brick gate post.


WEST ROXBURY, MASS.
STATION "FAULKNER"
TRANSFER TRIANGLE
Walnut Hill
2
N
2.15
PENTHOUSE
ON ROOF OF
SURGICAL BUILDING
9.91
STATION
"FAULKNER"
ALLENDALE ST.
DRIVEWAY to HOSPITAL
WHITCOMB AVE.
TO DEDHAM
CENTER
GRASS
PLOTS
STREET
TO BOSTON
E.E.I. Co. Light
Pole Nº 7225
J 8/0
E.E.I. Co. Light Pole Nº 7229
J 3/0
Cross Cut on
Catch Basin
33.33
52
20.43
Tack in 2" Tree
GRAVEL
WALK
53
27.31
18.56
Tack in 2" Tree
32.21
3.54
3.06
MON. with C.P.B. DISC
MON. with C.P.B. DISC
11.00
7.30
1
2
3
4
5
6
7
8
Wood Fence Posts
Iron Fence on Stone Wall
Iron Fence Posts

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FAULKNER STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Walnut Hill 2	2166.88		97 27 53.94
No Ref. Marks Ties only			

Detailed Description:

A bronze City Planning Board disc, set in a concrete pimple 3 inches above the tar and gravel roof of the penthouse housing the elevator mechanism at the northerly end of the roof of the Surgical Building of the Faulkner Hospital. The hospital is located at Centre Street, West Roxbury, and can be reached over Centre Street, either from Jamaica Plain or West Roxbury.

The view is excellent at this station except from west to north where the view is blocked by the hill just behind the hospital.

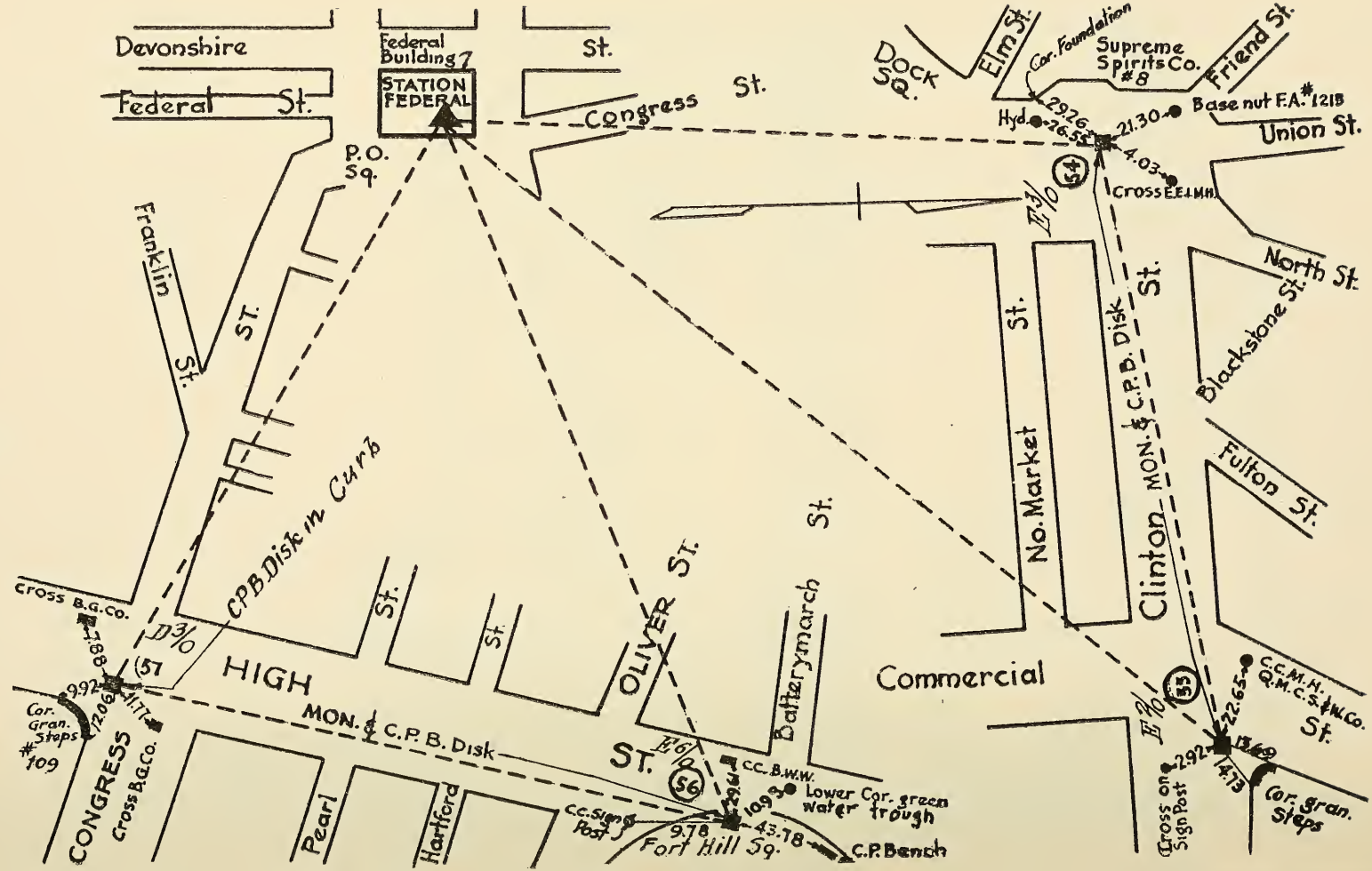
Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "FAULKNER" MONUMENT No. 52 — (First order traverse point No. J8/0).

Description: This point is a C. P. B. disc set in a monument flush with dirt sidewalk located on the easterly side of Centre Street about 250 feet south of Allandale Road.
Northeast 33.33′ from c. c. on light pole No. 7225.
Southwest 20.43′ from tack in 2″ tree.
West 3.06′ from tack in 6th fence post north of light pole 7225.
North 5.54′ from tack in 5th fence post north of light pole 7225.
Northeast 32.21′ from tack in 1st fence post north of light pole 7225.

GROUND TRAVERSE POINT, "FAULKNER" MONUMENT No. 53 — (First order traverse point No. J3/0).

Description: This point is a C. P. B. disc set in a monument flush with dirt sidewalk, located on easterly side of Centre Street about 60 feet south of Whitcomb Avenue, located as follows:
South 27.31′ from c. c. on catch basin.
South 18.56 from tack in 2″ tree.
West 7.30′ from iron fence post.
North 11.00′ from iron fence post.


Devonshire
Federal St.
Federal Building 7
STATION FEDERAL
St.
Congress St.
Dock Sq.
Elm St.
Cor. Foundation
Supreme Spirits Co. #8
Friend St.
Hyd.
29.26
26.55
21.30
Base nut F.A.# 1218
Union St.
4.03
Cross E.E.I.M.H.
P.O. Sq.
Franklin St.
ST.
CPB Disk in Curb
Cross B.G.Co.
D3/0
57
HIGH
St.
OLIVER ST.
St.
Batterymarch St.
No. Market St.
Clinton MON. & C.P.B. Disk St.
North St.
Blackstone St.
Fulton St.
Commercial
E2/0
55
C.C.M.H. Q.M.C.S. & M.Co.
22.65
13.69
St.
MON. & C.P.B. Disk
Cor. Gran. Steps #109
CONGRESS
Cross B.G.Co.
Pearl
Hartford
E1/0
56
C.C. B.W.W.
29.2
109
Lower Cor. green water trough
C.C. Sign Post 5
9.78
43.78
Fort Hill Sq.
C.P. Bench
Cross on Sign Post
2.92
4.73
Cor. Gran. Steps

(02)

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FEDERAL STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: K. T. ADAMS YEAR: 1933 LOCALITY: BOSTON

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, No. 1, No. 2, No. 3 Note, See below
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4 meters.
Height of telescope above station mark, 4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Powderhorn 3 1933		00 00 00	
R. M. No. 1	8.444	138 33 11	
R. M. No. 2	19.259	196 43 47	
R. M. No. 3	7.134	262 04 36	

Detailed Description: Station FEDERAL is a first-order station in the City of Boston. It is on the top of the new Federal Building in Post Office Square in the center of the business district of the City of Boston.

The station mark is a standard disc in the top of an 8-inch concrete dome cast on the reinforced concrete roof of the highest part of the building. The station mark is in the northeast corner of the roof which is surrounded by a parapet wall 7 feet high.

Three standard disc reference marks were established. They are cemented into drill holes on the top of the parapet wall. They are stamped and situated as follows:

"No. 1" — To the south and a little east of the station mark and just north of the junction of the north wall of the stairwall housing with the east parapet wall.

Described by S. E. G. Marked by W. H. L.

FEDERAL MASSACHUSETTS SUFFOLK
K. T. ADAMS 1933 BOSTON

"No. 2" — Southwest of the station mark and just south of the center of the west parapet wall.

"No. 3" — To the west and north of the station mark and at about the center of the north parapet wall.

The 1933–1934 observations were taken from an instrument stand whose head was 3.29 meters above the station mark. It is necessary to use a stand to clear the parapet wall. The stairwall housing, which is directly south of the station, and several pieces of weather bureau apparatus constitute the only obstructions to the view which is excellent.

The station mark is about 345 feet above mean sea level.

Described by S. E. GAZEN, Surveyor, C. & G. S. Marked by W. H. L.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: FEDERAL — STATE: MASSACHUSETTS — COUNTY: SUFFOLK
ESTABLISHED BY: K. T. ADAMS — YEAR: 1933 — LOCALITY: BOSTON
RECOVERED BY*: J. M. DEARBORN — YEAR: 1938

Detailed statement as to the fitness of the original description:

The Boston City Planning Board occupied and incorporated this station into their Boston Triangulation Scheme in 1938. All conditions set forth in the original description were found to be true. Reference ties and azimuths all check.

Position was transferred to the ground by two transfer triangles whose bases lie on High Street from Oliver Street to Congress Street and the other on Clinton Street from Dock Square to Commercial Street.

J. M. DEARBORN.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

GROUND TRANSFER POINT, "FEDERAL" MONUMENT No. 54 — (First order traverse No. E3/0).

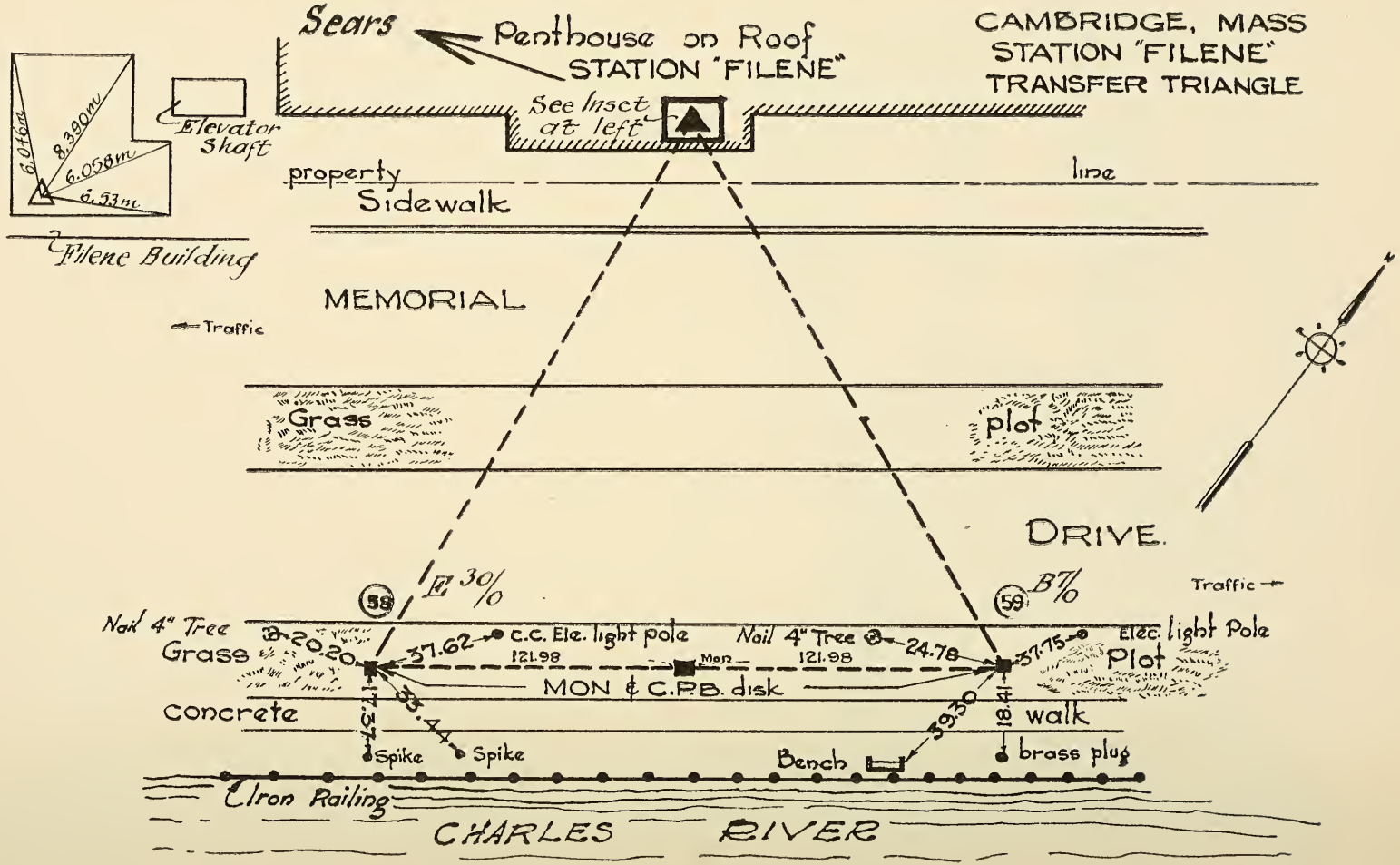
Description: This point is a C. P. B. disc set in a concrete monument on the west side of Dock Square near Friend Street.

Southwest 4.03′ from c. c. on E. E. I. M. H.
Northeast 26.55′ from base of hydrant.
Northeast 29.26′ from corner of foundation No. 8.
Southeast 21.30′ from base of F. A. No. 1215.

GROUND TRANSFER POINT, "FEDERAL" MONUMENT No. 55 — (First order traverse No. E2/0).
Description: This point is a C. P. B. disc set in a monument in the sidewalk on east corner of Clinton and Commercial Streets.
Northeast 2.92′ from c. c. on sign post.
East 22.65′ from c. c. on M. H.
Southwest 13.69′ from corner granite steps.
Southwest 14.73′ from corner granite steps.

GROUND TRANSFER POINT, "FEDERAL" C. P. B. DISC No. 57 — (First order traverse No. D3/0).
Description: This point is located at the intersection of High Street and Congress Street and consists of a C. P. B. disc set in curb.
West 11.77′ from c. c. B. G. Co. on Congress Street.
North 9.92′ from R. O. C. of granite steps of No. 109 High Street.
East 7.88′ from c. c. on B. G. Co. drip on High Street.

GROUND TRAVERSE POINT, "FEDERAL" MONUMENT No. 56 — (First order traverse point No. E6/0).
Description: A C. P. B. disc in concrete monument flush with grass plot of Fort Hill Square on east side of High Street and the north side of Oliver Street.
East 83.8′ from base of fire signal box No. 1291.
North 56.6′ from base of hydrant No. 16.
Northeast 76.7′ from base of E. E. I. pole No. 184.
Southeast 11.0′ from base of water fountain for horses.


Sears
Penthouse on Roof
STATION "FILENE"
CAMBRIDGE, MASS
STATION "FILENE"
TRANSFER TRIANGLE
See Inset at left
6.046m
8.390m
6.058m
6.53m
Elevator Shaft
property line
Sidewalk
Filene Building
MEMORIAL
Traffic
Grass
plot
DRIVE.
E 30'
B 7'
Traffic
58
59
Nail 4" Tree
20.20
37.62
c.c. Ele. light pole
121.98
Mon
121.98
Nail 4" Tree
24.78
37.75
Elec. light Pole
Grass
Plot
MON ¢ C.P.B. disk
Concrete
walk
17.37
33.44
59.30
18.41
Spike
Spike
Bench
brass plug
Iron Railing
CHARLES RIVER

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FILENE STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: DEMODENA YEAR: 1938 LOCALITY: CAMBRIDGE

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.70 meters.
Height of telescope above station mark, 1.99 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Sears	2613.37		43 25 08.70
No Ref. Marks only Ties			

Detailed Description:

A bronze C. P. B. disc set in a square concrete pimple on tar and gravel roof of stairway penthouse on the middle of southeast side of Filene's Building, situated on the northerly side of Memorial Drive in Cambridge, Massachusetts.

Situated 6.046 meters southeast of northwest corner of penthouse, 8.39 meters south of northeast corner, 7.53 meters southwest of southeast corner of penthouse.

Described by LEO DEMODENA Marked by.....

GROUND TRANSFER POINT, "FILENE" MONUMENT No. 58 — (First order traverse point No. E30/0).

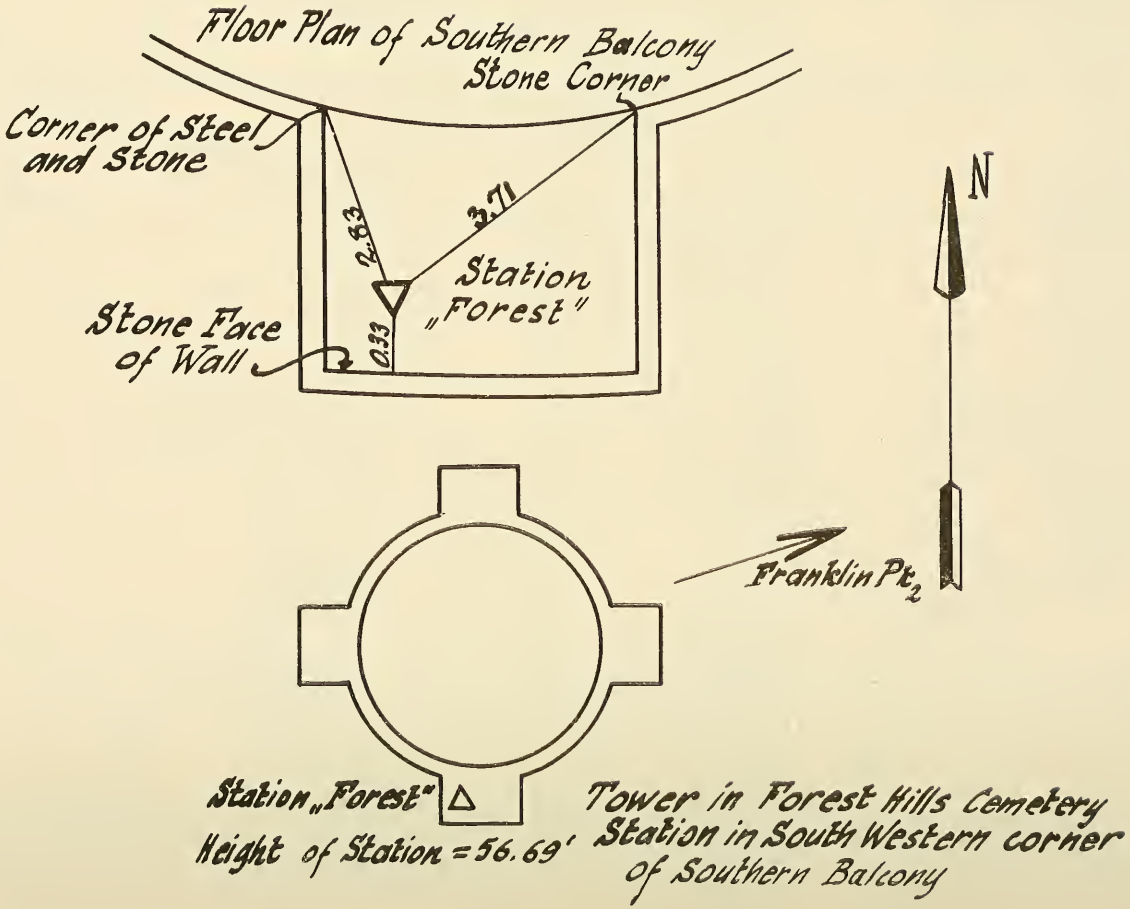
Description: This is a C. P. B. disc set in a concrete monument set flush with the grass plot on the east side of Memorial Drive and southeast of Station Filene.

East 20.20′ from nail in 4-inch tree.
Southwest 37.62′ from c. c. Elc. light pole.
West 33.44′ from spike, near guard railing.
Northwest 17.37′ from spike, near guard railing.

GROUND TRANSFER POINT, "FILENE" MONUMENT No. 59 — (First order traverse point No. B7/0).

Description: This point is located on the southeasterly side of Memorial Drive and consists of a C. P. B. disc set in a concrete monument flush with the grass plot.

Southwest 37.75′ from E. E. I. pole.
Northwest 18.41′ from brass plug near guard railing.
East 24.78′ from rail in 4-inch tree.
North 39.30′ from bench near railing.


Floor Plan of Southern Balcony
Stone Corner
Corner of Steel and Stone
2.63
3.71
Station „Forest"
Stone Face of Wall
0.33
N
Franklin Pt2
Station „Forest"
Height of Station = 56.69'
Tower in Forest Hills Cemetery
Station in South Western corner of Southern Balcony

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FOREST STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: BULLMAN YEAR: 1938 LOCALITY: HYDE PARK

Surface-station mark, Note, Disc in Balcony
Underground-station mark, Floor
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

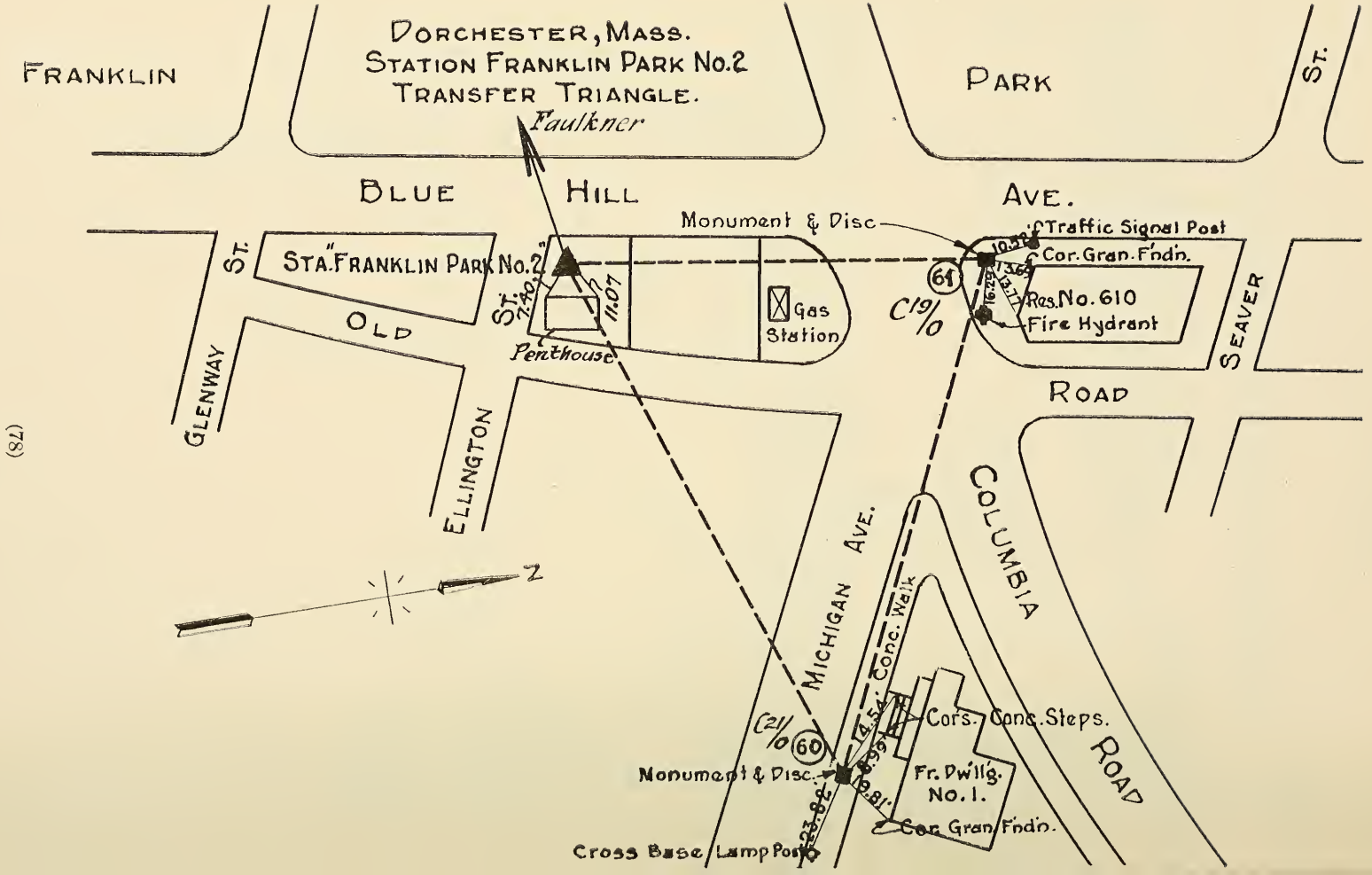
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Franklin Pk[2]	2000.00		252 25 30.48
No Ref. Marks Ties only			

Detailed Description:

A standard C. P. B. disc set flush in the southwestern corner of the stone floor of the southern balcony of the tower in Forest Hills Cemetery. Sketch shows ties to station. Station is reached by going easterly from the intersection of Washington and Morton Streets to the traffic circle and turning sharp right to the entrance to Forest Hills Cemetery.

Visibility is limited to the southern quadrants from this station. The height of station from the ground to the balcony is 56.69 feet.

Described by BULLMAN Marked by.....


DORCHESTER, MASS.
STATION FRANKLIN PARK No.2
TRANSFER TRIANGLE.
FRANKLIN
PARK
ST.
Faulkner
BLUE
HILL
AVE.
Monument & Disc
Traffic Signal Post
Cor. Gran. Fdn.
STA. "FRANKLIN PARK No.2"
ST.
OLD
GLENWAY
ELLINGTON
Penthouse
11.07
Gas Station
61
C19/0
Res. No. 610
Fire Hydrant
SEAVER
ROAD
MICHIGAN AVE.
COLUMBIA
ROAD
Conc. Walk
C21/0
60
Cors. Conc. Steps.
Monument & Disc.
Fr. Dw'llg. No. 1.
Cor. Gran. Fdn.
Cross Base Lamp Post
(78)

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: FRANKLIN PARK 2 STATE: MASSACHUSETTS COUNTY SUFFOLK
CHIEF OF PARTY: BULLMAN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.735 meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Faulkner	3695.68		88 53 06.31
No. Ref. Marks Ties only			

Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 4 inches above the tarred roof of the Franklin Park Theatre Building, located on Blue Hill Avenue, in Dorchester, between Ellington Street and Columbia Road. The station is on the roof of the most southerly section of the building, on that roof which is highest. It is reached from Ellington Street, through a passageway, up the fire escape and over the roof to the highest roof which has a penthouse on it. The station is west of the penthouse.

The view is good in all directions except that part to the east which is blocked by the penthouse. The tripod used cleared the penthouse.

Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "FRANKLIN PARK2" Monument No. 60 — (First order traverse point No. C21/0).

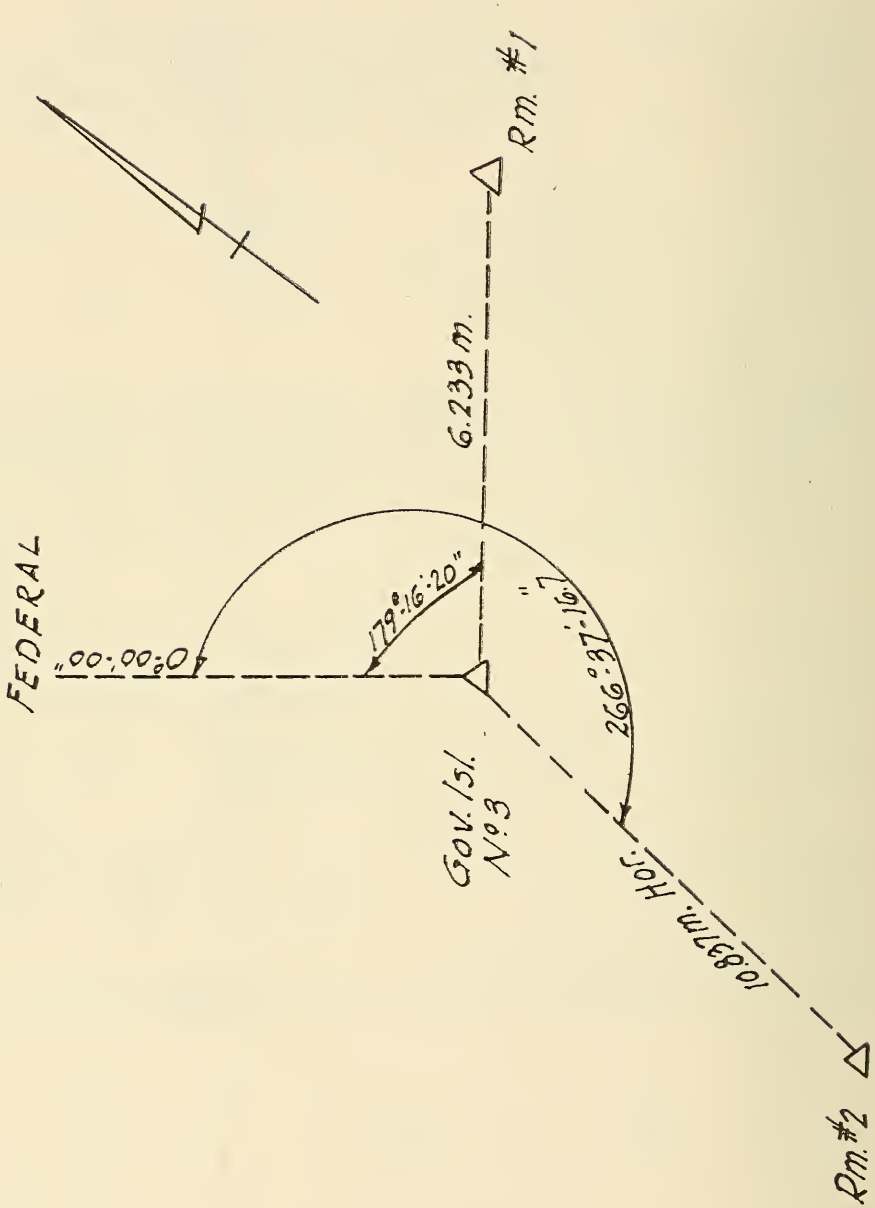
Description: This point is a C. P. B. disc in a monument set flush with concrete sidewalk, located on the north side of Michigan Avenue, about 100 feet east of center line at Old Road.

Northwest 23.82′ from c. c. on base of Lamp post.
Southeast 14.54′ from corner concrete steps No. 1 Michigan Avenue.
Southeast 8.99′ from corner concrete steps No. 1 Michigan Avenue.
Southwest 19.81′ from corner granite foundation No. 1 Michigan Avenue.

GROUND TRANSFER POINT, "FRANKLIN PARK2" Monument No. 61 — (First order traverse point No. C19/0).

Description: This is a C. P. B. disc set in a monument in the concrete sidewalk at the junction of Blue Hill Avenue and Columbia Road, on the northwest corner opposite No. 610 Blue Hill Avenue.

West 16.29′ from c. c. base of hydrant.
South 10.52′ from c. c. base of traffic signal.
Southwest 13.69′ from left outer granite base at entrance to No. 610 Blue Hill Avenue.
Southwest 13.77′ from right outer granite base at entrance to No. 600 Blue Hill Avenue.


Rm. #1
6.233 m.
FEDERAL
00°00'00"
179°16'20"
266°37'16"
Gov. Isl. No. 3
10.897m. Hor.
Rm. #2

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GOVERNOR'S ISLAND 3 STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: W. GRIFFIN YEAR: 1938 LOCALITY: GOV. IS. (BOSTON HARBOR)

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Castle	1543.99		6 20 23.11

Detailed Description:

Station Governor's Island No. 3 is a recovered C. and G. S. triangulation station, incorporated into the Boston City Planning Board main triangulation scheme in 1938. The original description was checked and found to be in error as shown on tne accompanying sketch as compared with the original.

Described by L. DEMODENA Marked by.....

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: GOVERNOR'S ISLAND 3 STATE: MASSACHUSETTS COUNTY: SUFFOLK
ESTABLISHED BY FRANCIS BLAKE YEAR: 1877 LOCALITY: GOVERNOR'S ISLAND (Boston Harbor)
RECOVERED BY:* F. L. PEACOCK, JR. YEAR: 1934

Detailed statement as to the fitness of the original description:

Station Governor's Island 3 is a recovered Coast and Geodetic Survey triangulation station incorporated into the 1934 second order triangulation. It is on Governor's Island, in Boston Harbor, and on the earth parapet which runs approximately north and south on the westerly side of the granite block house on the highest part of the island. The station is slightly west of the top of the parapet, and nearer its southerly end than its northerly end.

The station monument is a granite post about 6 inches square, and said to be 5 feet deep, buried vertically in the ground with its top projecting about 6 inches above the surface. The station mark is a small hole drilled in the top of the post.

Two standard disc reference marks were added in 1934. They are stamped "GOVERNOR'S ISLAND 3 NO. 1" and "GOVERNOR'S ISLAND 3 NO. 2" respectively, and are cemented flush in the tops of granite posts about 6 inches square and 4 feet deep, set vertically in the ground with their tops projecting about 8 inches above the surface. No. 1 is to be eastward at the foot of the parapet and about 8 feet lower than the station mark. No. 2 is to the southward, atop the parapet, and at its southerly end.

Set-up is good on firm hard ground. View is clear except in the eastern quadrant, where it is obscured by the block house. In 1934 observations were taken from a 27-foot instrument tripod with corresponding observers platform, which gave adequate clearance over the block house to stations PENAL and STRONG.

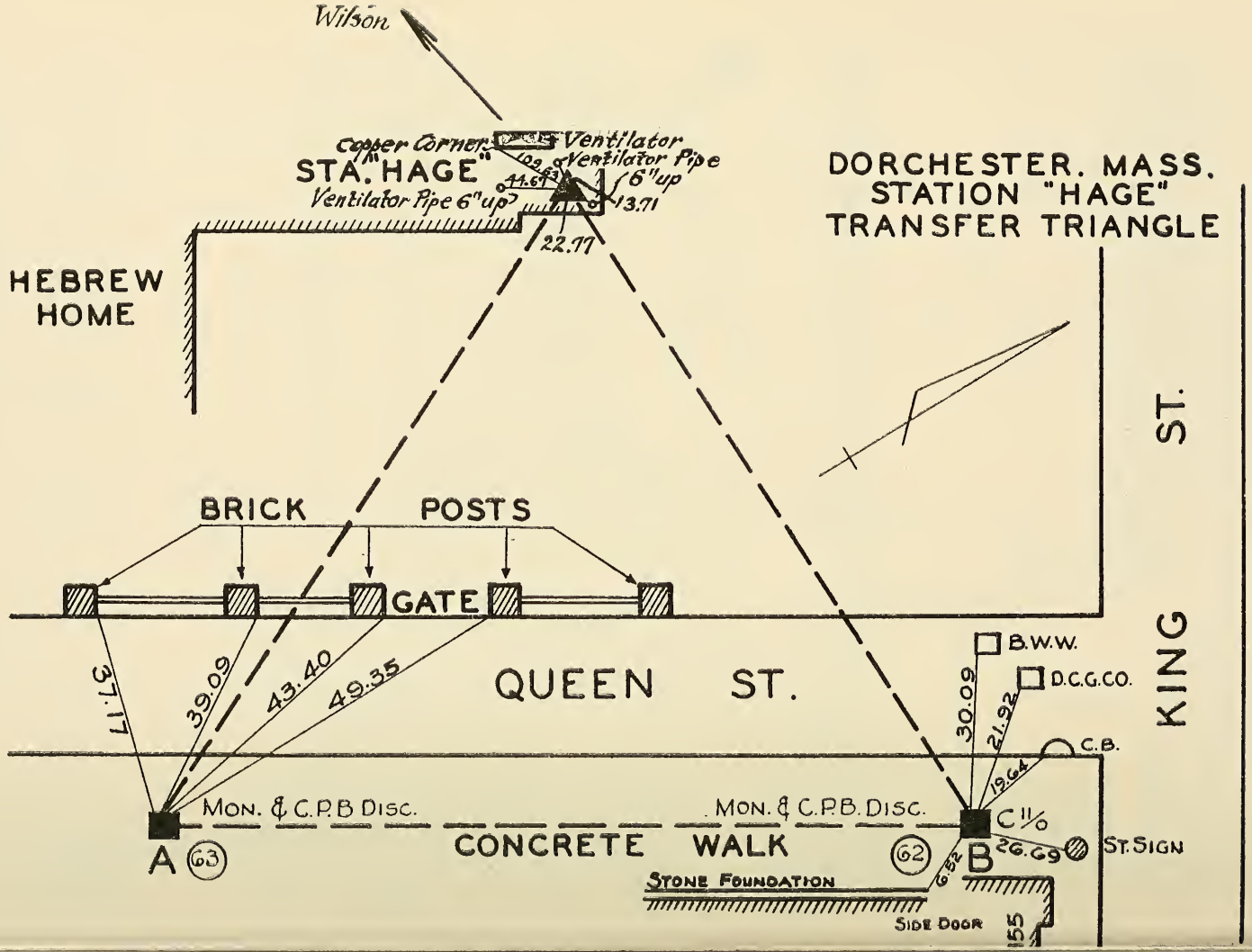
Distances and Directions to reference marks.

Object		Horizontal Direction	Direction			Azimuth		
			″	°	′	°	′	″
Moonhead 2,	1860		00	00	00.0	340	51	13.2
R. M. No. 2		10.826m	23	55	06	43	46	19
Federal	1933		117	17	10.2	98	08	23.4
Governor's Island 4 State		55.186m	282	26	00	263	17	13.5
R. M. No. 1		6.170	296	28	31	277	19	44

W. H. LEA, SURVEYOR, C. and G. S.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.


Wilson
Copper Corner
Ventilator
Ventilator Pipe
6"up
STA. "HAGE"
44.69
13.71
Ventilator Pipe 6"up
22.77
DORCHESTER. MASS.
STATION "HAGE"
TRANSFER TRIANGLE
HEBREW HOME
BRICK POSTS
GATE
KING ST.
QUEEN ST.
37.17
39.09
43.40
49.35
B.W.W.
D.C.G.CO.
30.09
21.92
C.B.
19.64
MON. & C.P.B. DISC.
MON. & C.P.B. DISC.
C 11/0
CONCRETE WALK
A (63)
(62) B
26.69
ST. SIGN
STONE FOUNDATION
6.52
SIDE DOOR
155

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HAGE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: DEARBORN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, la
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCE AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Wilson	1888.95		43 33 04.80
No ref. marks Ties only			

Detailed Description:

A C. P. B. disc set in a concrete pimple 4 inches above a tar and gravel roof of the Hebrew Home for the Aged, 21 Queen Street, Dorchester, Massachusetts. Station mark is located on the northerly corner of the roof of the brick annex. Visibility is good in all directions but south where trees and houses on the adjacent hill block the view. Station is best reached by taking King Street, from Neponset Avenue to Queen Street.

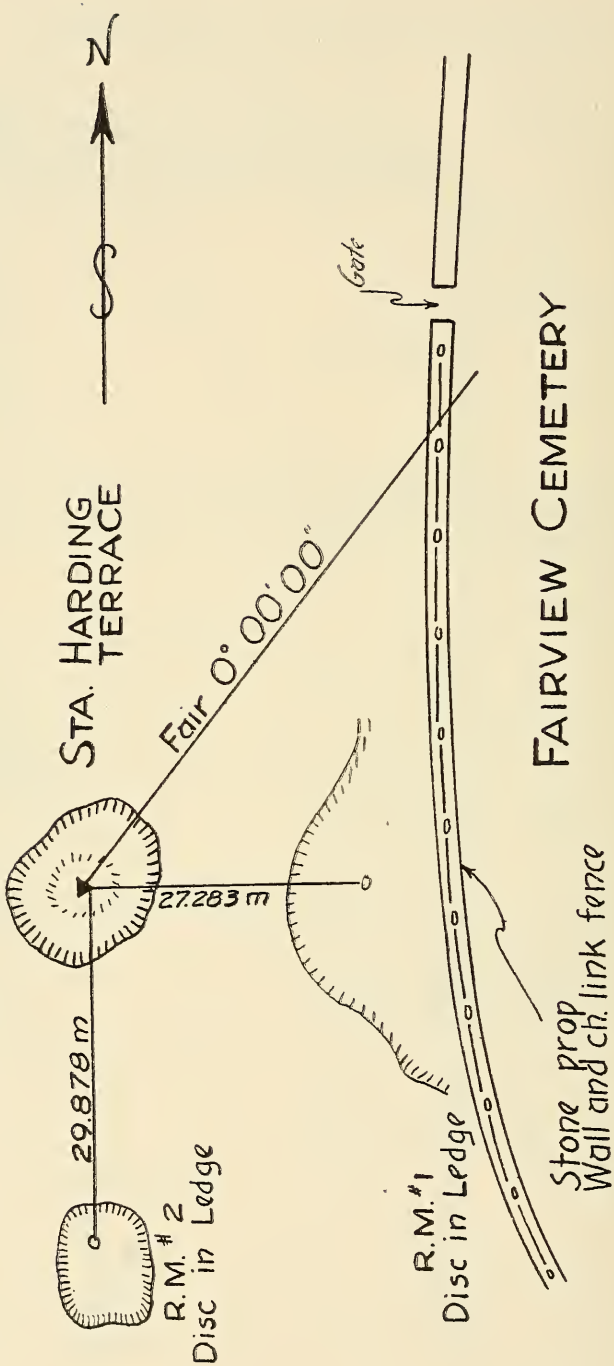
Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT, "HAGE" MONUMENT No. 62 — (First order traverse point No. C11/0).

Description: This point is a standard C. P. B. disc set in a concrete monument on the east side of Queen Street, near King Street.
Monument is flush with concrete sidewalk.
Northwest 6.52′ from stone foundation on side door of No. 155 King Street.
Southeast 30.09′ from c. c. on B. W. W.
Southeast 21.92′ from c. c. on B. C. G. Co. drip.
South 19.64′ from c. c. on catch-basin rim.
Southwest 26.69′ from street sign post.

GROUND TRANSFER POINT, "HAGE" MONUMENT No. 63.

Description: This point is a C. P. B. disc set in a concrete monument flush with the sidewalk on the east side of Queen Street.
Southeast 37.17′ from corner brick fence post.
Southeast 39.09 'from corner brick fence post.
South 43.40′ from corner brick fence post.
South 49.35′ from corner brick fence post.


N
STA. HARDING TERRACE
Fair 0° 00' 00"
27.283 m
29.878 m
R.M. # 2
Disc in Ledge
R.M. # 1
Disc in Ledge
Gate
FAIRVIEW CEMETERY
Stone prop
Wall and ch. link fence

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HARDING TERRACE, 1935 STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: A. BURTON YEAR: 1935 LOCALITY: DEDHAM

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

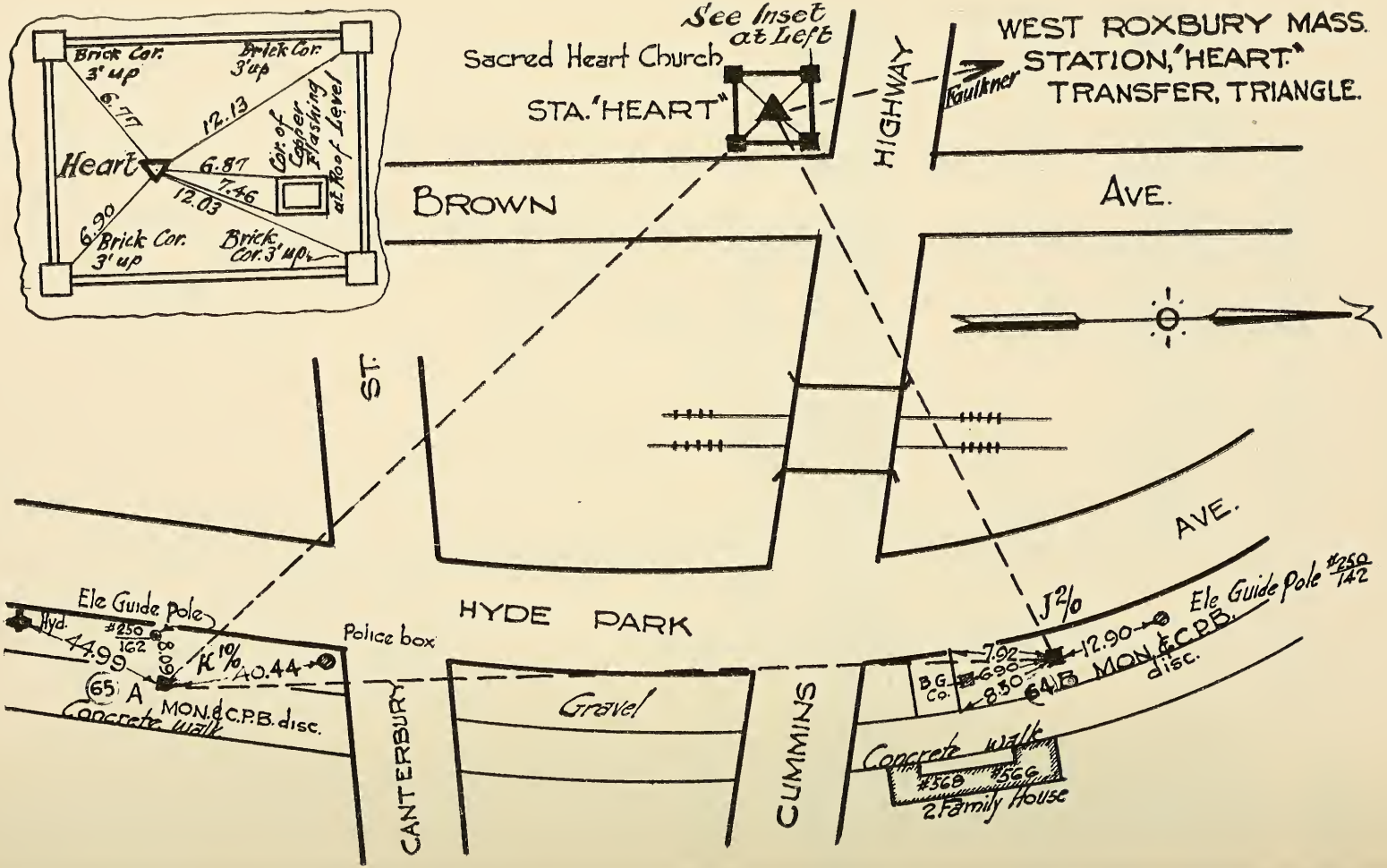
Object	Distance	Direction	Azimuth
	Feet	° ′ ″	° ′ ″
Belle	10129.25	00 00 00.0	183 08 26.9
Blue Hill	15569.82	143 14 23.6	326 22 50.5
Dedham Courthouse No. 2	8231.9	268 49 31.2	92 11 58.71

Detailed Description:

U. S. C. and G. S. and State Survey standard disc set in large ledge. Located in the northeast part of Dedham just north of Fleming Street and 600 feet southeast of the center line of Leonard Street. Ledge is highest point in vicinity and has a sheer drop of 12 feet on south side. Ledge is just beyond angle in Fleming Street, and is nearly opposite center line of long tangent of Fleming Street. Visibility limited to about 4 miles horizon.

Latitude 42 14 51.838 X = 695,779.36
Longitude 71 08 46.526 Y = 454,867.71

Described by A. BURTON Marked by.....


See Inset at Left
Sacred Heart Church
STA. "HEART"
HIGHWAY
WEST ROXBURY MASS.
STATION, "HEART"
TRANSFER, TRIANGLE.
Faulkner
BROWN
AVE.
ST.
AVE.
HYDE PARK
Police box
Ele Guide Pole
#250
162
Hyd.
44.99
60.08
K 1%
A 0.44
65 A
MON. & C.P.B. disc.
Concrete walk
CANTERBURY
Gravel
CUMMINS
J 2%
Ele Guide Pole #250 142
7.92
12.90
B.G. Co.
G 9.90
8.50
64.5
MON. & C.P.B. disc.
Concrete walk
#568
#566
2 Family House
Brick Cor. 3" up
Brick Cor. 3" up
6.77
12.13
Heart
6.87
7.46
12.03
6.90
Brick Cor. 3" up
Brick Cor. 3" up
Cor. of Copper Flashing at Roof Level

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HEART STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Faulkner	2331.05		165 30 58.87
No Ref. Marks Ties only			

Detailed Description:

A punch mark on the top of a copper nail set in the copper roof deck of the tower of the Sacred Heart Church in Roslindale.

The Church is located on the top of the hill halfway between Hyde Park Avenue and Washington Street at the corner of Cummins Highway and Brown Avenue.

View is excellent in all directions.

Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "HEART" MONUMENT No. 64 — (First order traverse point No. J2/0).

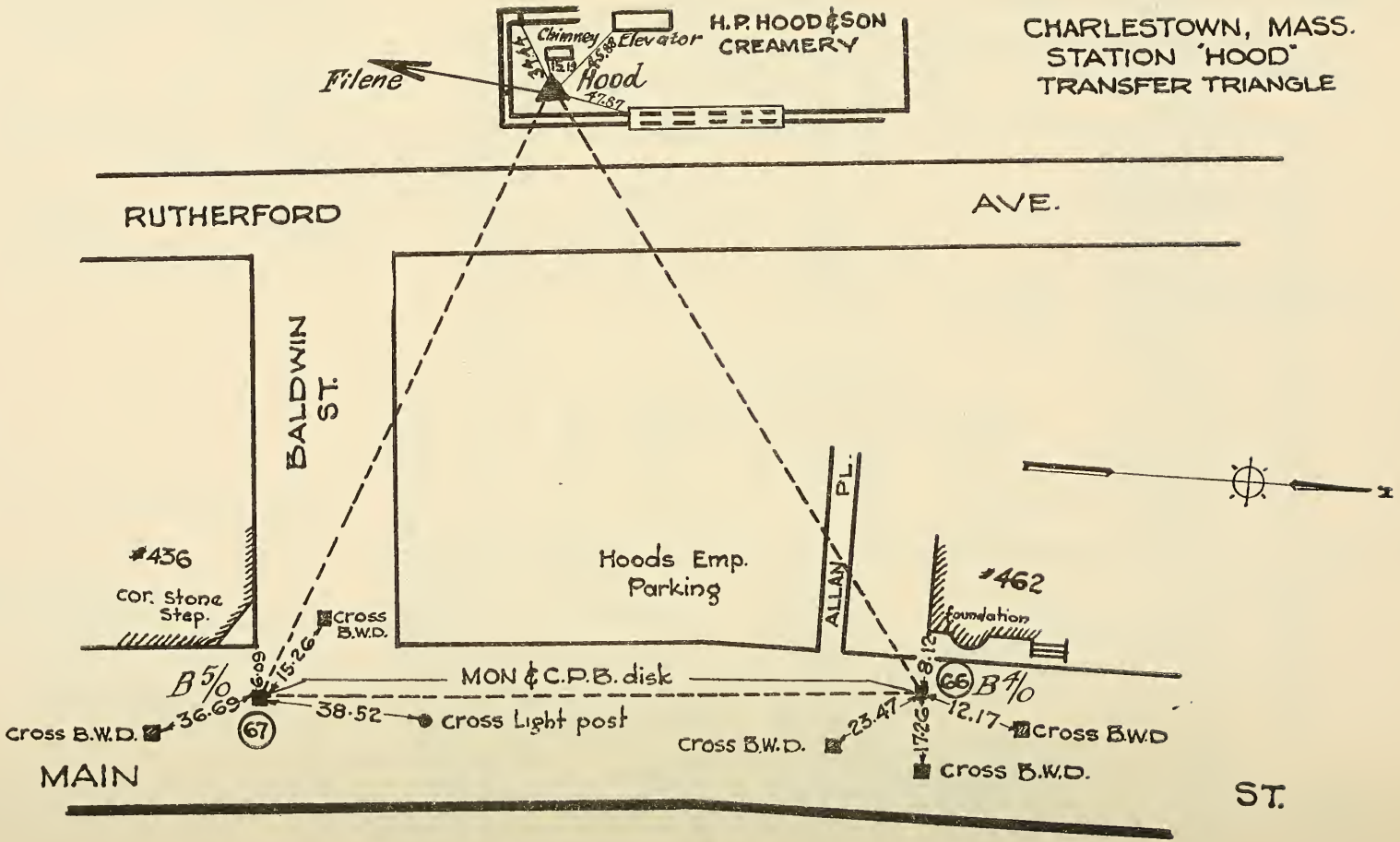
Description: This point is a C. P. B. disc in a concrete monument located on the easterly side of Hyde Park Avenue in front of No. 566–568.

Northwest 8.50′ from intersection of sidewalk with walk to No. 566–568.
North 6.90′ from B. G. Co.
North 7.92′ from corner of outer end of walk to No. 566–568.
Southeast 12.90′ from El guide pole No. 250/142.

GROUND TRANSFER POINT, "HEART" MONUMENT No. 65 — (First order traverse point No. K10/0).

Description: This point is a C. P. B. disc set in a concrete monument set flush with the concrete sidewalk on the easterly side of Hyde Park Avenue near Canterbury Street.

Northeast 44.99′ from hydrant.
East 8.09′ from El guide pole No. 250/162.
South 40.44′ from police box.


CHARLESTOWN, MASS.
STATION "HOOD"
TRANSFER TRIANGLE
H.P. HOOD & SON
CREAMERY
Chimney
Elevator
Hood
Filene
RUTHERFORD
AVE.
BALDWIN
ST.
#436
cor. Stone
Step.
Cross
B.W.D.
Hoods Emp.
Parking
ALLAN
PL.
#462
foundation
B 5/0
6.09
15.26
MON & C.P.B. disk
B 4/0
66
67
36.69
38.52
cross Light post
23.47
12.17
Cross B.W.D
cross B.W.D.
MAIN
ST.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HOOD STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: DEMODENA YEAR: 1938 LOCALITY: CHARLESTOWN

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.37 meters.
Height of telescope above station mark, 1.66 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Filene	2281.49		18 53 41.12
No. Ref. Marks			
Only Ties			

Detailed Description:

A bronze C. P. B. disc set in concrete pimple 4 inches above tar and gravel roof situated at the northeast corner of the Hood Milk Company, on southerly side of Rutherford Avenue, in Charlestown, Mass.

Located 13.985 meters southeast of the southerly corner of elevator penthouse, 4.63 meters east of southeast corner of chimney.

Described by LEO DEMODENA Marked by.....

GROUND TRANSFER POINT, "HOOD" MONUMENT No. 66 — (First order traverse No. B4/0).

Description: This point is a C. P. B. disc set in a concrete monument set flush with the sidewalk on the west side of Main Street near Allan Place.

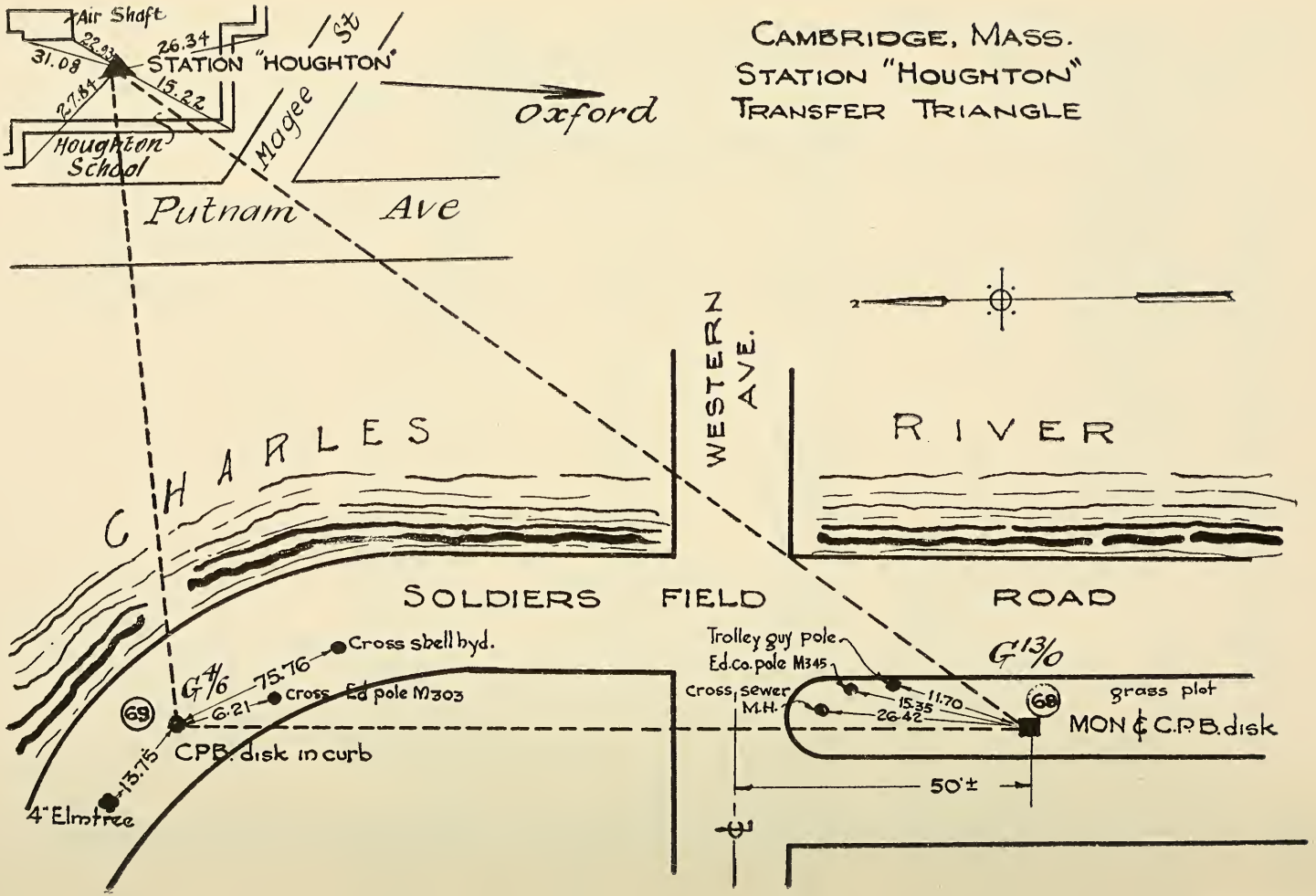
East 8.12′ from south corner of No. 462 Main Street.
Southwest 12.17′ from c. c. B. W. D.
West 17.26′ from c. c. B. W. D.
Northwest 23.47′ from c. c. B. W. D.

GROUND TRANSFER POINT, "HOOD" MONUMENT No. 67 — (First order traverse point No. B5/0).

Description: This point is a C. P. B. disc set in a concrete monument flush with the sidewalk on the west side of Main Street at the intersection of Baldwin Street.

Northwest 36.69′ from c. c. on B. W. D.
East 6.09′ from corner stone steps of No. 436 Main Street.
Southeast 15.26′ from c. c. on B. W. D.
South 38.52′ from c. c. on light post.

Cambridge, Mass.
Station "Houghton"
Transfer Triangle



FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HOUGHTON STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: CAMBRIDGE

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 1.8 meters.
Height of telescope above station mark, 1.5 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Oxford	1674.21		05 39 25.76
No Ref. Marks Ties only			

Detailed Description:

A standard C. P. B. disc station mark set in a square block of concrete on the roof of the Houghton School, corner of Putnam Avenue and Magee Street, in the city of Cambridge.

Located 15.22 feet northeast from the outside corner of the copper flashing of the southwest corner of the roof; and 27.84 feet southeast from the outside corner of copper flashing of the nearest jog on the front of the school; and 26.34 feet northwest from the outside corner of copper flashing of the nearest jog on the Magee Street side of the school; and 22.93 feet southwest from the lowest brick in the near corner of a brick air shaft.

Described by JOHNSON Marked by.....

GROUND TRANSFER POINT, "HOUGHTON" MONUMENT No. 68 — (First order traverse point No. G13/0).

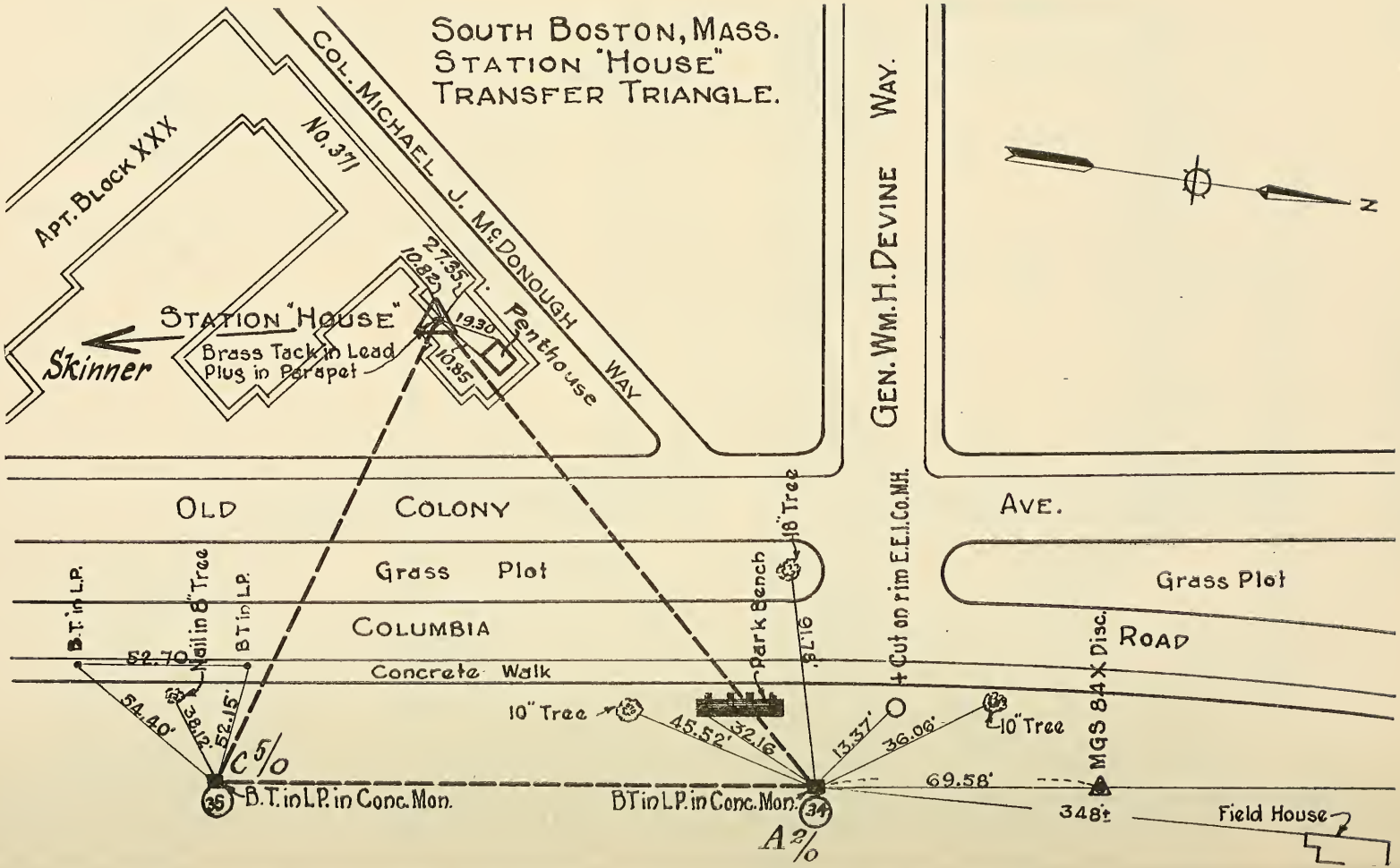
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground in the grass plot near the intersection of Soldiers Field Road and Western Avenue, approximately 50 feet from the center line of Western Avenue.

South 26.42′ from c. c. sewer M. H.
Southwest 15.35′ from Ed./Co. pole M345.
Southwest 11.70′ from Trolley guy pole.

GROUND TRANSFER POINT, "HOUGHTON" C. P. B. DISC IN CURB No. 69. (First order traverse No. G4/6).

Description: This point is a C. P. B. disc set in curb on the southwesterly side of Soldiers Field Road near P. I. of curve.

Southeast 13.75′ from 4″ elm tree.
North 6.21′ from c. c. E. E. I. pole No. M303.
Northwest 75.76′ from c. c. on shell hydrant.


SOUTH BOSTON, MASS.
STATION "HOUSE"
TRANSFER TRIANGLE.
APT. BLOCK XXX
No. 371
COL. MICHAEL J. McDONOUGH WAY
GEN. WM. H. DEVINE WAY
STATION "HOUSE"
Brass Tack in Lead Plug in Parapet
Skinner
27.35
10.82
19.30
10.85
Penthouse
N
OLD COLONY AVE.
Grass Plot
COLUMBIA ROAD
Concrete Walk
Grass Plot
B.T. in L.P.
Nail in 8" Tree
B.T. in L.P.
52.70'
54.40'
38.12'
52.15'
C 5/0
35
B.T. in L.P. in Conc. Mon.
10" Tree
45.52'
32.16'
Park Bench
18" Tree
B.T. in L.P.
+ Cut on rim E.E.I.Co.MH.
13.37'
36.06'
10" Tree
MGS 84 X Disc.
69.58'
348'
Field House
BT in L.P. in Conc. Mon.
34
A 2/0

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HOUSE
CHIEF OF PARTY: JOHNSON

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: SOUTH BOSTON

Surface-station mark, Note, Ob
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 4.2 meters.
Height of telescope above station mark, 4.4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

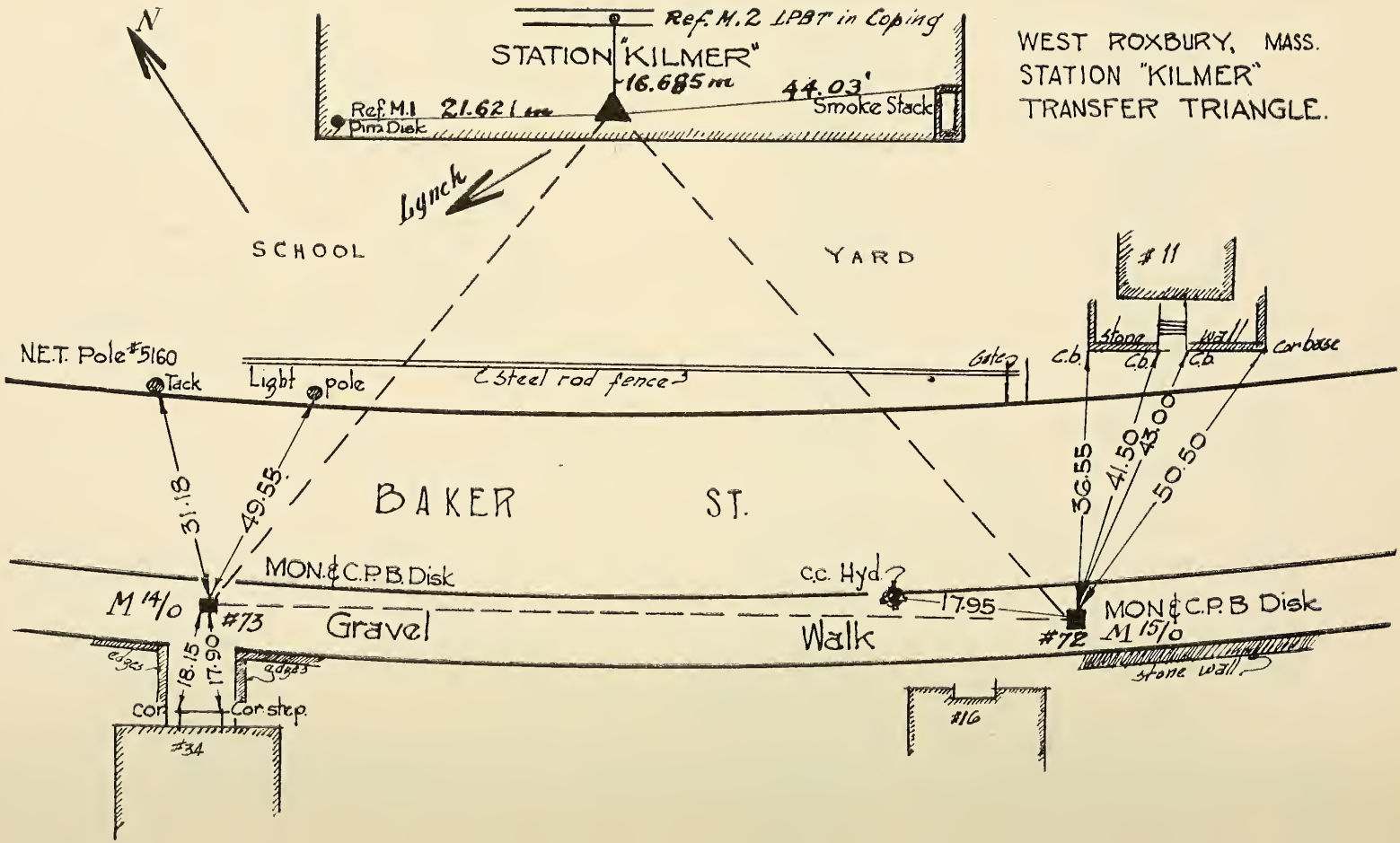
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Skinner	960.53		357 26 50.35
No Ref. Marks Ties only			

Detailed Description:

A brass tack in a lead plug in the parapet of Block XXX on the roof of the Old Harbor Village Housing Project, in South Boston, near the entrance of 371 Old Colony Avenue.

Located 10.83 feet from southeast corner of penthouse; 19.30 feet southeast from southwest corner of same penthouse; 31.62 feet south from northeastern corner (outside) of building; 27.34 feet northeast from inside corner of jog in parapet of west side of building.

Described by JOHNSON Marked by .....



WEST ROXBURY, MASS.
STATION "KILMER"
TRANSFER TRIANGLE.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KILMER STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, No. 1 Note, 11a
Reference mark, No. 2 Note, 15a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Lynch	1642.29	0 00 00	85 53 08.26
R. M. No. 1	21.621	34 18 11.66	120 11 19.926
R. M. No. 2	16.685	124 0 49.16	209 53 57.426

Detailed Description: A C. P. B. disc set in concrete 4 inches above the tar and gravel roof of the Joyce Kilmer School, Baker Street, West Roxbury, Massachusetts.

Station mark is located on the roof approximately in the center of the school 4.62 feet from the stone coping on the Baker Street side.

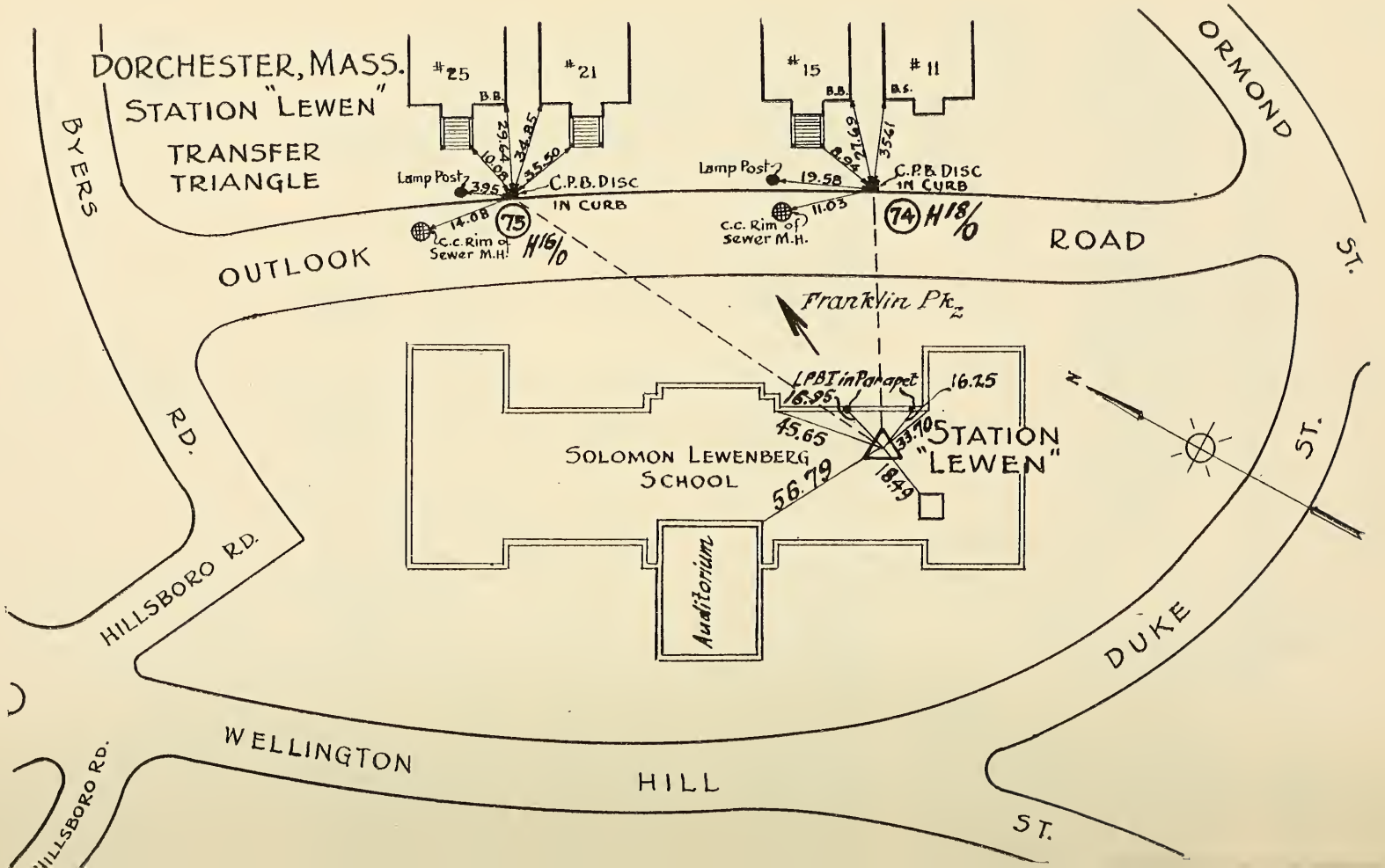
Ref. Mark No. 1 is a C. P. B. disc set in a concrete pimple at the westerly corner of the roof. Ref. Mark No. 2 is a L. P. B. T. in the stone coping on the northeast side of the school.

Visibility is limited in all directions, but is fair from northwesterly around to the south. School is reached by taking Baker Street south off Spring Street, West Roxbury.

Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT, "KILMER" MONUMENT No. 73 — (First order traverse point No. M14/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with gravel sidewalk, located on westerly side of Baker Street.
Southwest 31.18′ from N. E. Tel. pole No. 5160.
Southwest 49.55′ from light pole.
Northeast 17.90′ from corner steps at No. 34.
Northeast 18.15′ from corner steps at No. 34.

GROUND TRANSFER POINT, "KILMER" MONUMENT No. 72 — (First order traverse point No. M15/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with gravel sidewalk on the southwesterly side of Baker Street, at No. 16, about 200 feet west of Centre Street.
Southeast 17.95′ from c. c. on hydrant.
Southwest 36.55′ from corner base of stone wall at No. 11 Baker.
Southwest 41.50′ from corner base of stone wall at No. 11 Baker.
Southwest 43.00′ from corner base of stone wall at No. 11 Baker.
Southwest 50.50′ from corner base of stone wall at No. 11 Baker.


DORCHESTER, MASS.
STATION "LEWEN"
TRANSFER
TRIANGLE
#25
#21
#15
#11
B.B.
B.S.
ORMOND
ST.
BYERS
RD.
OUTLOOK
ROAD
Lamp Post
C.P.B. DISC
IN CURB
C.C. Rim of
Sewer M.H.
75
H16/0
74
H18/0
Franklin Pk.
LPBI in Parapet
16.25
16.95
45.65
33.70
56.79
18.49
SOLOMON LEWENBERG
SCHOOL
STATION
"LEWEN"
Auditorium
HILLSBORO RD.
DUKE
ST.
WELLINGTON
HILL
ST.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LEWEN
CHIEF OF PARTY: JOHNSON
STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, No. 1 Note
Reference mark, No. 2 Note
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, meters.
Height of telescope above station mark, 3.3 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Franklin Pk. 2	2431.59	0 00 00	199 31 43.35
Ref. Mark No. 1	4.95	76 23 25	275 55 08.35
Ref. Mark No. 2	5.17	331 09 40	170 41 23.35
Note: Reference Marks Nos. 1 and 2 are lead plugs set in the top of brass tacks in parapet.			

Detailed Description:

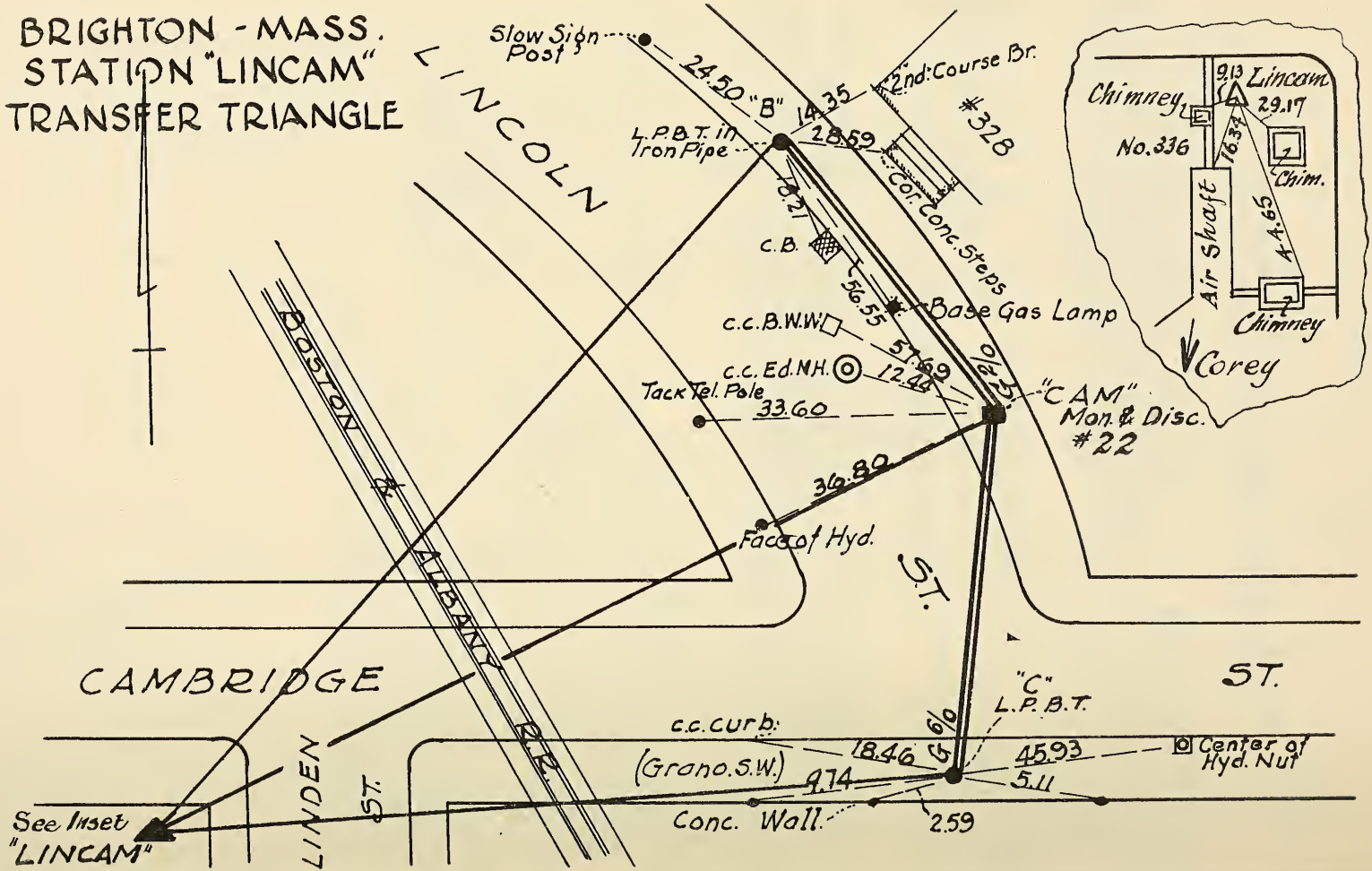
A standard C. P. B. disc station mark set in a square block of concrete on the roof of the Solomon Lewenberg School on Wellington Hill in the Mattapan section of Dorchester.

Located 33.70 feet northwest from inside corner of parapet of south wing; 18.49 feet north from near corner of copper air shaft; 56.79 feet southeast from near corner of auditorium wall; 45.65 feet south from inside corner of nearest jog in parapet over entrance; 16.25 feet west from L. P. B. T. in parapet; and 16.95 feet south from L. P. B. T. in parapet.

Described by JOHNSON Marked by GIACOBBO

GROUND TRANSFER POINT, "LEWEN" C. P. B. DISC No. 75 — (First order traverse point No. H16/0).
Description: This point is a C. P. B. disc set in the curb on the northeast side of Outlook Road.
Southeast 14.08′ from c. c. on rim of sewer M. H.
Southeast 3.95′ from lamp post.
South 10.08′ from steps at No. 25 Outlook Road.
Southwest 29.64′ from corner B. B. No. 25 Outlook Road.
Southwest 34.85′ from corner B. B. No. 21 Outlook Road.
West 35.50′ from steps at No. 21 Outlook Road.

GROUND TRANSFER POINT, "LEWEN" C. P. B. DISC No. 74 — (First order traverse point No. H18/0).
Description: This point is a C. P. B. disc set in the curb on the northeast side of Outlook Road.
Southeast 11.03′ from c. c. on rim of sewer M. H.
Southeast 19.58′ from lamp post.
South 8.94′ from steps at No. 15 Outlook Road.
Southwest 27.69′ from corner B. B. at No. 15 Outlook Road.
Southwest 35.61′ from corner B. B. at No. 11 Outlook Road.


BRIGHTON - MASS.
STATION "LINCAM"
TRANSFER TRIANGLE
Slow Sign Post
24.50
"B"
14.35
2nd. Course Br.
#328
L.P.B.T. in Iron Pipe
28.59
Cor. Conc. Steps
8.21
C.B.
56.55
Base Gas Lamp
c.c.B.W.W.
57.69
c.c. Ed. M.H.
12.45
Tack Tel. Pole
33.60
"CAM" Mon. & Disc. #22
36.80
Face of Hyd.
LINCOLN
BOSTON & ALBANY R.R.
ST.
CAMBRIDGE
ST.
"C"
L.P.B.T.
c.c. curb:
18.46
6%
45.93
Center of Hyd. Nut
(Grano. S.W.)
9.74
5.11
Conc. Wall
2.59
See Inset "LINCAM"
LINDEN ST.
Chimney
9.13
Lincam
29.17
No. 336
16.34
Chim.
Air Shaft
44.65
Chimney
Corey

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LINCAM STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. MAGUIRE YEAR: 1938 LOCALITY: BRIGHTON

Surface-station mark, Note, 1a
Underground-station, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.81 meters.
Height of telescope above station mark, 2.10 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Corey No Ref. Marks Ties only	1512.19		06 49 06.97

Detailed Description:

A C. P. B. disc set in concrete pimple which is set on a tar and gravel roof at corner of Linden and Cambridge Streets, Allston, on house No. 1 and No. 336 respectively.

Pimple is located 9.13 feet from northeast corner of brick chimney in a northeast direction, 16.34 feet from the south end of brick partition wall in a northerly direction, 44.65 feet from northeast corner of brick chimney in northwest direction, 29.17 feet from northwest corner of brick chimney in a westerly direction.

Described by J. MAGUIRE Marked by.....

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: Cam STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: BRIGHTON

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Lincam	Feet	00 00 00	25 42 02
Ref. Mark No. 1	357.8	78 52 35	104 34 37
Ref. Mark No. 2	225.7	269 59 59	295 42 01
Note: Ref. Mark No. 1 is a L. P. B. T. in pipe. Ref. Mark No. 2 is a L. P. B. T. in concrete sidewalk.			

Detailed Description:

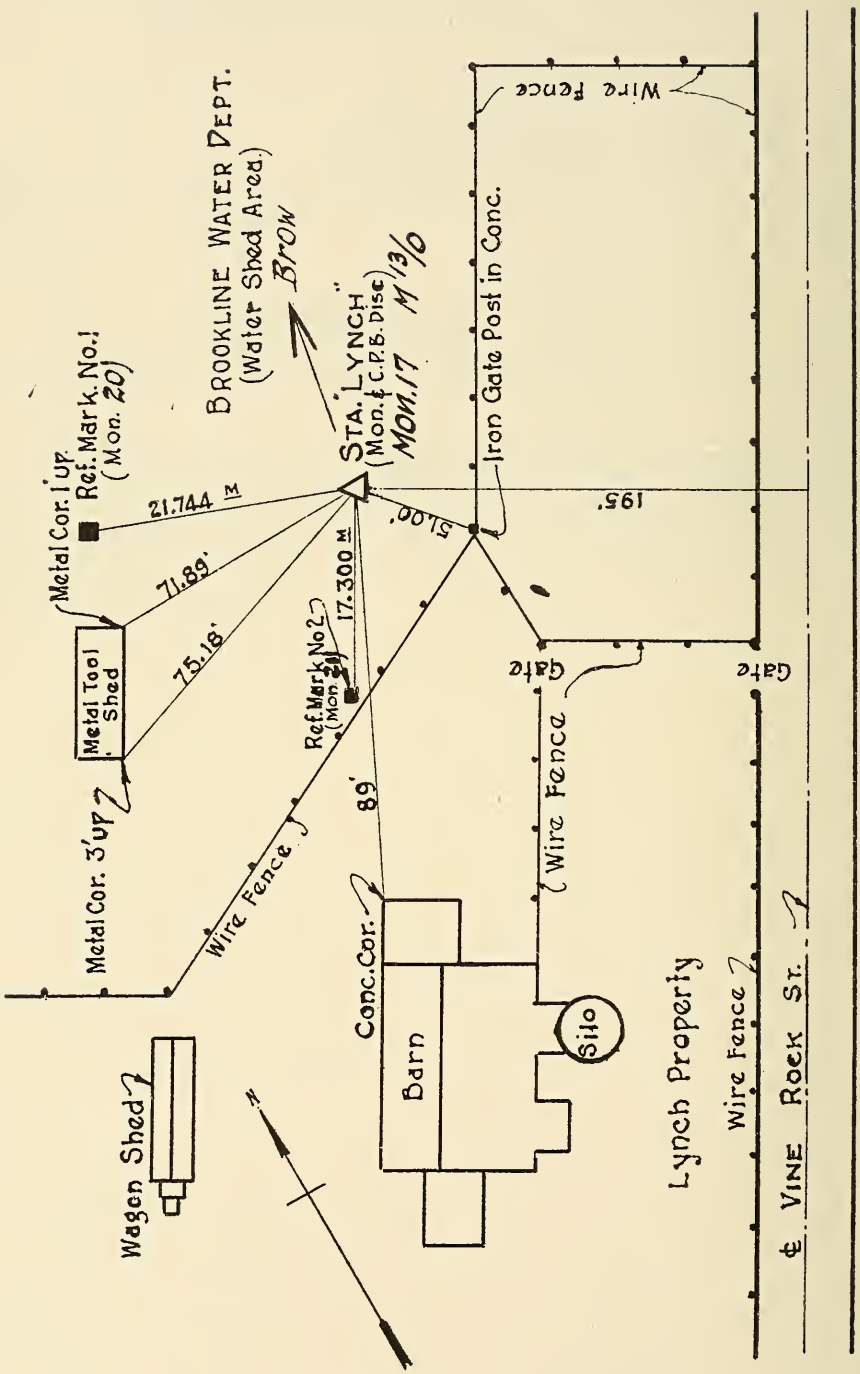
A. C. P. B. disc set in a concrete monument, the top of which is flush with the ground, situated on the northerly dirt sidewalk of Lincoln Street, approximately 200 feet west of the centerline of Cambridge Street about 31 feet west of tack in a corner fence post which is a boundary between the property of the Sunoco Oil Co. and the Boston and Albany R. R. Station Cam is the easterly end of the Lincoln Street ground base No. 3. Position elevated to Station Lincam.

Described by HENRY ADELMAN Marked by.....

GROUND TRANSFER POINT, "LINCAM" "CAM" MONUMENT No. 76 — (First order traverse point No. G2/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the northerly side of Lincoln Street.
This point is also the easterly end of the ground base No. 3 (Palm-Lincoln).
Northeast 36.80′ from face of hydrant.
East 33.60′ from tack in Tel. Co. pole.
East 12.44′ from c. c. on rim of E. E. I. M. H.
Southeast 57.69′ from c. c. on rim of B. W. W.

GROUND TRANSFER POINT, "LINCAM" L. P. B. T. (First order traverse point No. G6/0).
Description: This point is a Lead Plug and Brass Tack in concrete sidewalk on Cambridge Street opposite Lincoln Street.
East 18.46′ from c. c. on curb stone.
West 45.93′ from center bolt on hydrant.
Northwest 5.11′ from concrete wall on south side of Cambridge Street.
Northeast 9.74′ from concrete wall on south side of Cambridge Street.

GROUND TRANSFER POINT, "LINCAM" L. P. B. T. PT. "B".
Description: This point is a L. P. B. T. in an iron pipe located on the northeast side of Lincoln Street.
Southeast 24.50′ from "Slow" sign post.
Southwest 14.35′ from corner No. 328 Lincoln Street.
West 28.59′ from corner concrete steps No. 328 Lincoln Street.
North 18.21′ from catch-basin.


BROOKLINE WATER DEPT.
(Water Shed Area)
BROW
STA. LYNCH
(Mon. & C.P.B. Disc)
MON. 17 M 1/3 0
Ref. Mark No. 1
(Mon. 20)
Metal Cor. 1' up
21.744 M
71.89'
75.18'
Metal Tool Shed
Metal Cor. 3' up
Ref. Mark No. 2
(Mon. 19)
17.300 M
51.00'
195'
Iron Gate Post in Conc.
Wire Fence
Gate
Gate
Wire Fence
89'
Wire Fence
Conc. Cor.
Barn
Silo
Wagon Shed
Lynch Property
Wire Fence
E. VINE ROCK ST.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LYNCH
CHIEF OF PARTY: H. ADELMAN

STATE: MASSACHUSETTS COUNTY: NORFOLK
YEAR: 1938 LOCALITY: DEDHAM

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1, Note, 11a
Reference mark, No. 2, Note, 11a
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 6.30 meters.
Height of telescope above station mark, 6.59 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

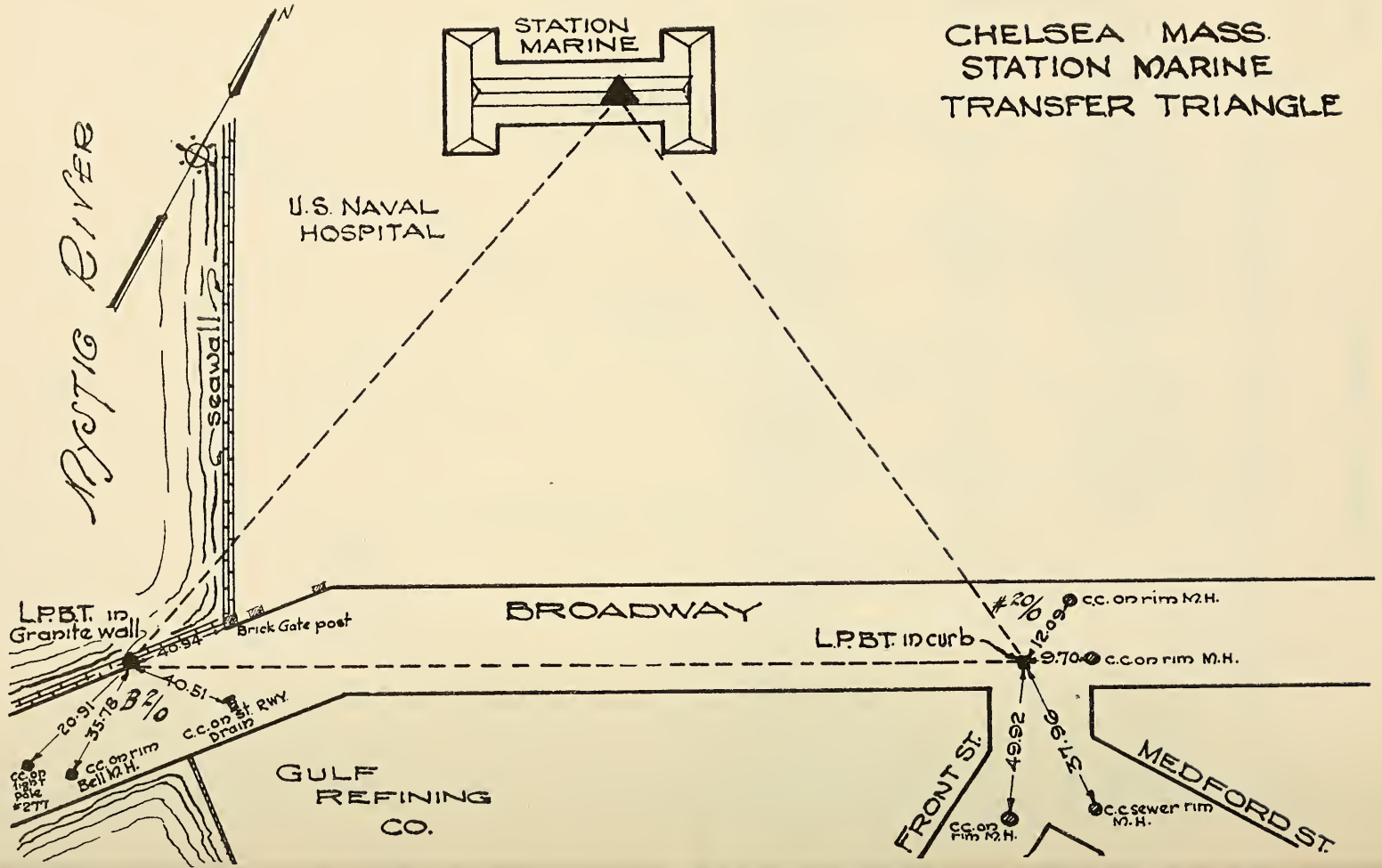
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Brow	1015.17	0 00 00	189 54 18.12
Ref. Mark No. 1	21.744	300 47 20	130 41 38.12
Ref. Mark No. 2	17.300	207 26 50	37 21 08.12

Detailed Description:

A C. P. B. disc set in a concrete monument the top of which is about 9 inches above the ground, situated in the Brookline Water Department water shed area in Dedham. Located about 195 feet north of the wire property fence of the Lynch Farm; about 195 feet north of the center line of Vine Rock Street; about 89 feet northeast of concrete corner of the Lynch Barn.

Station is reached by going south on Spring Street after crossing the Charles River Bridge, take Needham Street and then a right at Vine Rock Street.

Described by H. ADELMAN Marked by.....


CHELSEA MASS.
STATION MARINE
TRANSFER TRIANGLE
STATION MARINE
U.S. NAVAL HOSPITAL
MYSTIC RIVER
Seawall
N
BROADWAY
L.P.B.T. in Granite wall
Brick Gate post
40.94
40.51
B.M.
L.P.B.T. in curb
#20
12.09
C.C. on rim M.H.
9.70
C.C. on rim M.H.
20.91
35.78
C.C. on Bell M.H.
C.C. on Drain
C.C. on rim M.H.
GULF REFINING CO.
FRONT ST.
49.92
37.96
C.C. sewer rim M.H.
C.C. on rim M.H.
MEDFORD ST.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MARINE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: H. F. JOHNSON YEAR: 1937 LOCALITY: CHELSEA

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.76 meters.
Height of telescope above station mark, 2.05 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Powderhorn No. 4	1801.99	0 00 00	222 21 56.57
Ref. Mark No. 1	16.30	64 29 00	286 50 56.51
Ref. Mark No. 2	16.27	188 11 50	50 33 46.51
Note: Reference M	ark No. 1	is the near	corner of the
chimney on the sout	heastern	corner of t	he roof.
Reference Mark No.	2 is the n	ear corner o	f the southwest
chimney.			

Detailed Description:

A galvanized survey tack driven through the copper on the ridge pole of the U. S. Marine Hospital in Chelsea.

The tack is located 22.67 feet from the face of the cupola, south along the ridge pole, and 15.67 feet from the southern end of the ridge pole, north along the ridge pole; and 17.67 feet northwest from the northwest corner of the nearest chimney; and 19.41 feet northwest from the southwest corner of the chimney.

Described by H. F. JOHNSON Marked by.....

GROUND TRANSFER POINT, "MARINE" — (First order traverse point No. B2/0).
Description: This point consists of a L. P. B. T. in granite wall on the northwest side of Broadway.
South 40.94′ from brick gate post.
West 40.51′ from c. c. on Street Railway drain.
North 35.78′ from c. c. on rim Bell M. H.
North 20.91′ from c. c. on light pole No. 277.

GROUND TRANSFER POINT, "MARINE" — (First order traverse point No. 20/0).
Description: This point is on the easterly side of Broadway and consists of a L. P. B. T. set in curb at the intersection of Front Street, Medford Street and Broadway.
South 12.09′ from c. c. on rim of M. H.
West 9.70′ from c. c. on rim of M. H.
North 49.92′ from c. c. on rim of M. H.
Northwest 37.96′ from c. c. on rim of M. H.

City of Boston Pumping Station
Chain Link Fence
Spike in light pole
MILE ROAD
MILE
C.P.B. Disk in Mon.4
10.20
23.85
11.32
13.00
36.08
49.83
Ref. Mark No. 1
49.98
Ref. Mark No. 2
Rail Fence
Sobig
N

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MILE
CHIEF OF PARTY: JOHNSON

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, No.1 Note, 11a
Reference mark, No. 2 Note, 11a
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark meters.
Height of telescope above station mark, 4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CANBE SEEN FROM THE GROUND

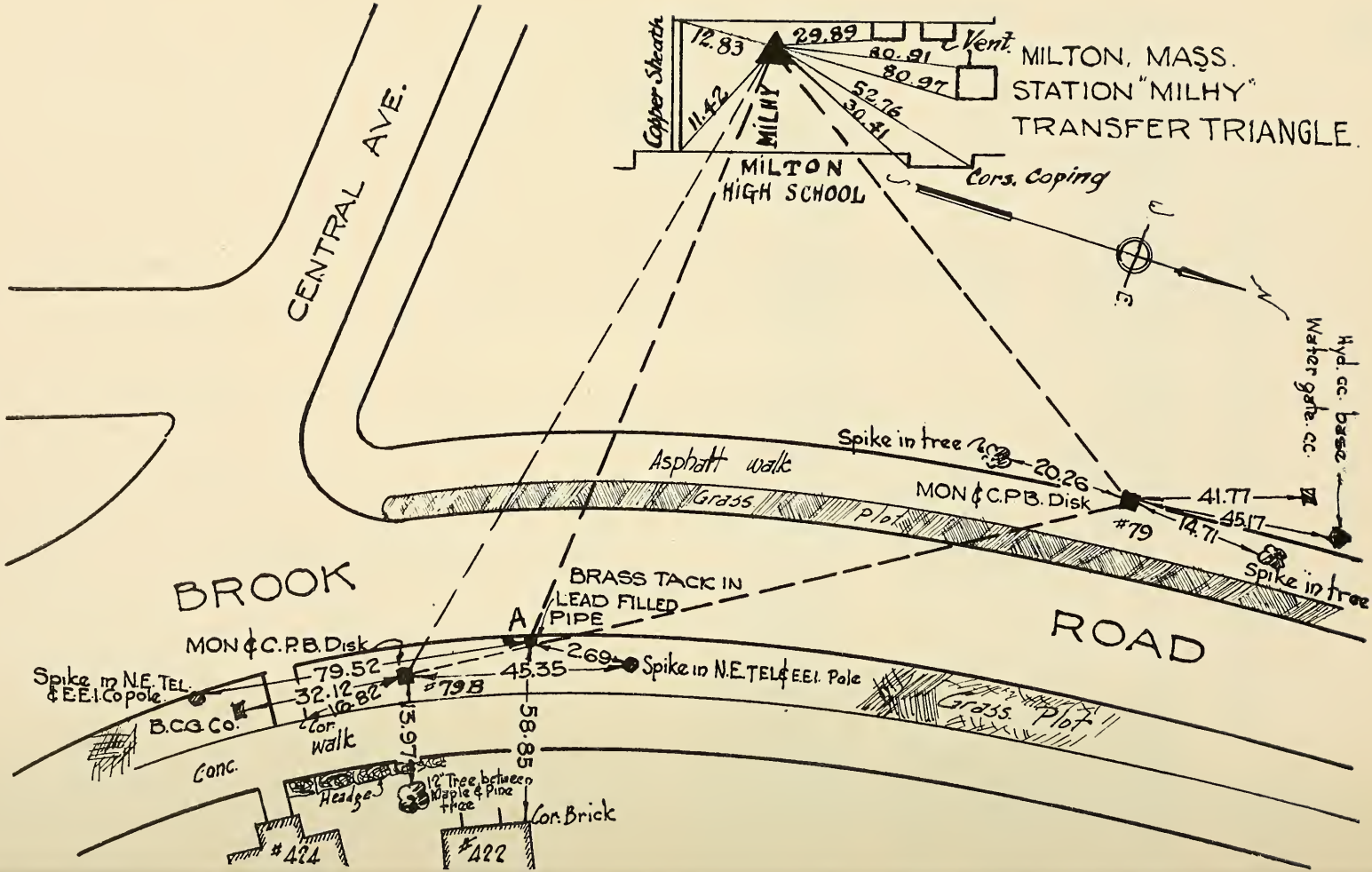
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Sobig	1881.50	0 00 00	164 31 35.35
Ref. Mark No. 1	15.21	213 41 15	18 12 50.35
Ref. Mark No. 2	15.19	304 14 15	108 45 50.35

Detailed Description:

A standard C. P. B. disc station mark set in a square block of concrete which is 4 inches above ground, about 13.0 feet south of the east end of center line of Mile Road in Dorchester.

Located 23.85 feet southwest from north gate post; 11.32 feet southwest from south gatepost of Pumping Station; 36.08 feet southeast from spike in light pole; 10.2 feet west from chain link fence enclosing City of Boston Pumping Station.

Described by JOHNSON Marked by.....


MILTON, MASS.
STATION "MILHY"
TRANSFER TRIANGLE.
Copper Sheath
12.83
29.89
Vent.
80.91
80.97
52.76
30.41
11.42
MILHY
MILTON
HIGH SCHOOL
Cors. coping
CENTRAL AVE.
Hyd. cc. base
Water gate. cc.
Spike in tree
20.26
Asphalt walk
MON ¢ C.P.B. Disk
41.77
45.17
14.71
#79
Grass Plot
Spike in tree
BROOK
ROAD
BRASS TACK IN
LEAD FILLED
PIPE
A
MON ¢ C.P.B. Disk
2.69
Spike in N.E. TEL & E.E.I. Pole
Spike in N.E. TEL. & E.E.I. Co pole
79.52
32.12
10.82
#798
45.35
B.C.G. Co.
Cor. walk
Conc.
3.97
58.85
Grass Plot
Hedge
12" Tree between Maple & Pine tree
Cor. Brick
#424
#422

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MILHY STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: MILTON

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 6.30 meters.
Height of telescope above station mark, 6.59 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Tucker	1007.40		106 37 05.81
No Ref. Marks Ties only			

Detailed Description:

A standard C. P. B. disc set in concrete pimple on a tar and gravel roof of the Milton High School at Brook Road and Central Avenue, Milton, Mass.

Visibility is excellent in all but the true easterly and westerly directions where view is blocked by trees.

Station is located on the northerly side, near the approximate center of the school.

Station is best reached by taking Route No. 28 from Mattapan Square to Brook Road and School.

Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT, "MILHY" MONUMENT No. 79B.

Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the east side of Brook Road, near Central Avenue.
Southwest 13.97′ from 12-inch tree between maple and pine.
Northwest 16.82′ from corner of walk.
Northwest 32.12′ from B. C. G. Co.
Northwest 79.52′ from spike in N. E. Tel. and E. E. I. pole.
Southeast 45.35′ from spike in N. E. Tel. and E. E. I. pole.

GROUND TRANSFER POINT, "MILHY" MONUMENT No. 79.

Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the west side of Brook Road.
North 20.26′ from spike in tree.
Southeast 41.77′ from c. c. in water gate.
South 45.17′ from c. c. in base of hydrant.
South 14.17′ from spike in tree.

GROUND TRANSFER POINT, "MILHY" L. P. B. T. PT. "A".

Description: This point is a L. P. B. T. in a pipe on the east side of Brook Road, 42.89′ from monument No. 79B.
Southwest 58.85′ from corner brick at No. 422 Brook Road.
South 2.69′ from spike in N. E. Tel. and E. E. I. pole.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: MOUNT AUBURN TOWER STATE: MASSACHUSETTS COUNTY: MIDDLESEX
ESTABLISHED BY: H. L. WHITING YEAR: 1860 LOCALITY: WATERTOWN
RECOVERED BY:* J. M. DEARBORN YEAR: 1938

Detailed statement as to the fitness of the original description:

Station Mount Auburn Tower is a recovered Coast and Geodetic Survey station incorporated into the second order triangulation as a supplemental station. There is no original description available, but the point recovered, a small drill hole in the floor at the top of the tower, and approximately in the center, is undoubtedly the point used in 1860 and subsequently.

The tower is in the extreme eastern part of the town of Watertown, in the grounds of the Mount Auburn Cemetery, atop the highest hill in the cemetery. It is of smooth matched granite, circular in plan, and 60 feet high. The diameter is about 15 feet. A balcony surrounds the tower about two thirds the way up, and the top has a slight overhang. The top is floored with granite and is surrounded with a coping and rail about 3 feet high. A circular stairway also of granite comes up around a round column of granite in the center of the tower. The station mark is atop this central column.

In 1934 the drill hole was re-marked by a standard disc stamped "MT. AUBURN, 1861–1934" cemented flush with its shank centered in the hole.

Set-up is good. View is clear for a considerable distance in all directions.

In 1938 this station was incorporated into the first order triangulation scheme of the Boston City Planning Board and its position was transferred for control purposes to Soldiers Field Road, Brighton, Massachusetts.

J. M. DEARBORN

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MOUNT AUBURN TOWER STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: F. L. PEACOCK YEAR: 1860 LOCALITY: WATERTOWN

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Palm	1211.54		11 59 47.98

Detailed Description: Station Mount Auburn Tower is a recovered C. and G. S. station incorporated into the 1934 second order triangulation. There is no original description available, but the point recovered, a small drill hole in the floor at the top of the tower, and approximately in the center, is undoubtedly the point used in 1860 and subsequently.

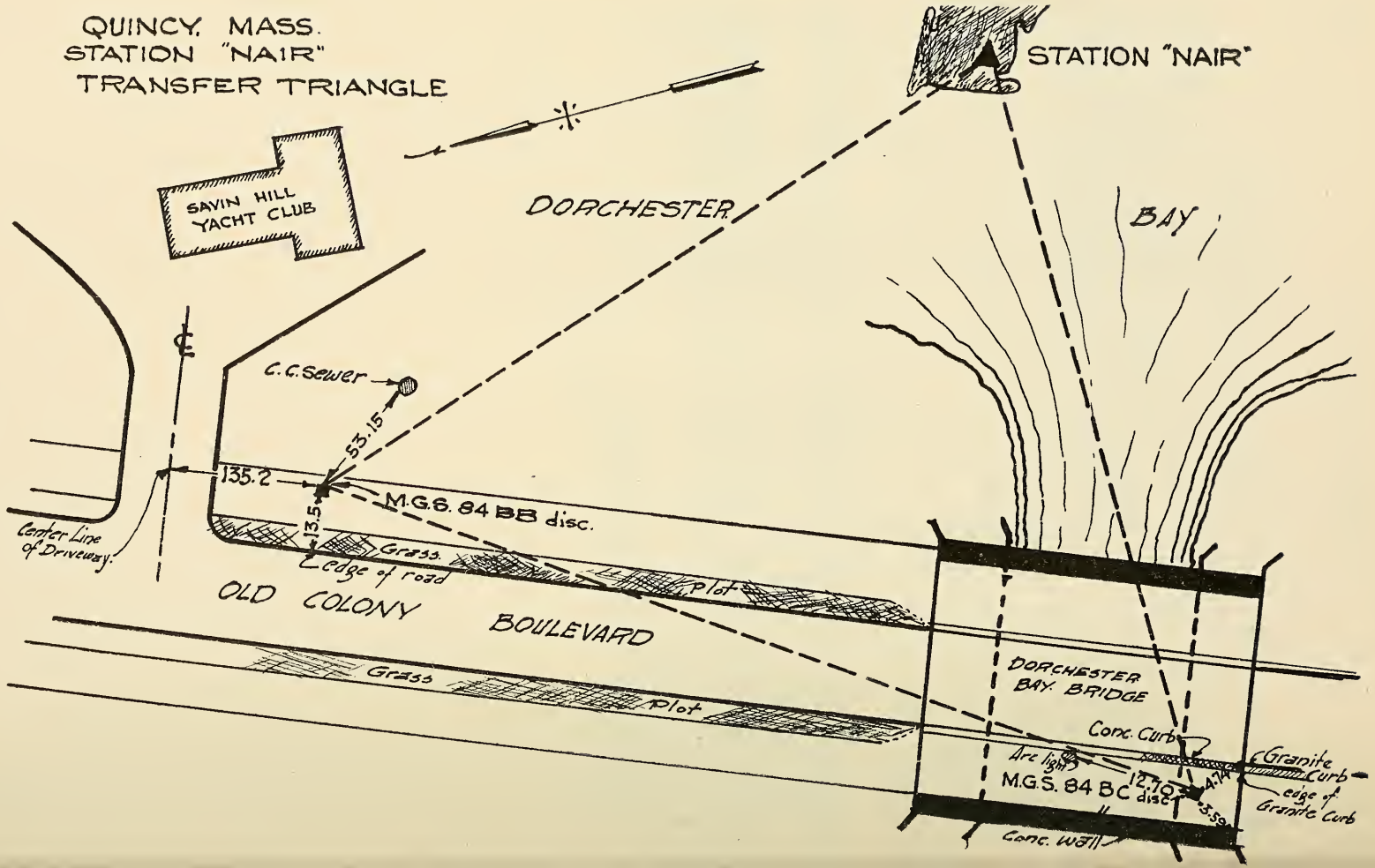
The tower is in the extreme eastern part of the city of Watertown, in the grounds of the Mount Auburn Cemetery, atop the highest hill in the cemetery. It is of smooth matched granite, circular in plan, and 60 feet high. The diameter is about 15 feet. A balcony surrounds the tower about two thirds the way up, and the top has a slight overhang. The top is floored with granite and is surrounded with a coping and rail about 3 feet high. A circular stairway also of granite comes up around a round column of granite in the center of the tower. The station is atop this central column.

In 1934 the drill hole was re-marked by a standard disc stamped "MT. AUBURN, 1861–1934" cemented flush with its shank centered in the hole.

Set-up is good. View is clear for a considerable distance in all directions.

Described by Marked by.....

W. H. LEA, Surveyor C. and G. S.


QUINCY. MASS.
STATION "NAIR"
TRANSFER TRIANGLE
STATION "NAIR"
SAVIN HILL
YACHT CLUB
DORCHESTER
BAY
C.C. Sewer
53.15
135.2
13.5
M.G.S. 84 BB disc.
Center Line
of Driveway
Grass
Edge of road
Plot
OLD COLONY
BOULEVARD
Grass
Plot
DORCHESTER
BAY. BRIDGE
Conc. Curb
Arc light
M.G.S. 84 BC
12.70
disc
4.74
3.58
Granite Curb
edge of
Granite Curb
Conc. Wall

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: NAIR STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: SQUANTUM

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, No. 1 Note, 15a
Reference mark, No. 2 Note, 15a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.22 meters.
Height of telescope above station mark, 1.5 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Hage	1496.46		57 31 12.64

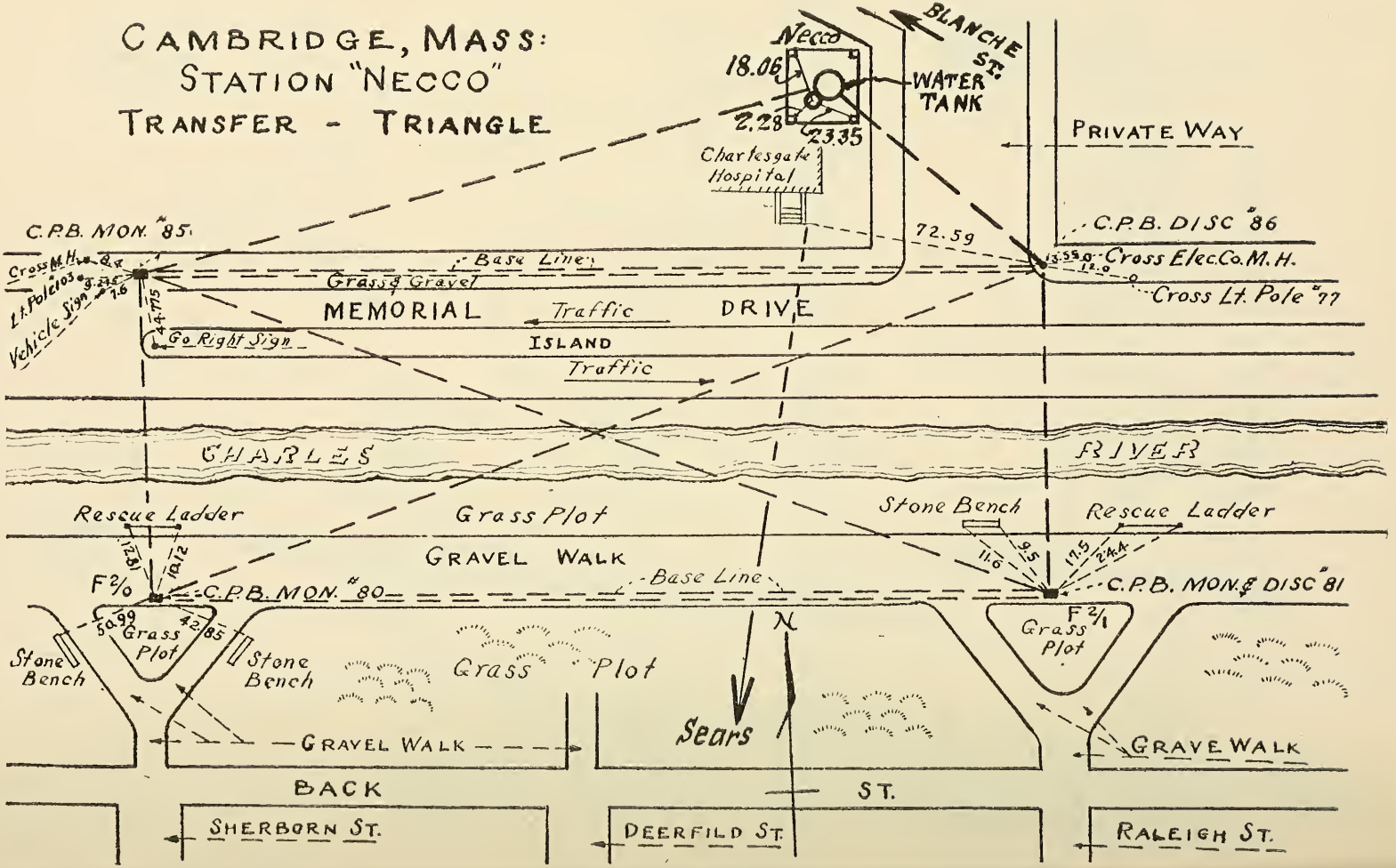
Detailed Description:

A U. S. E. granite monument with brass plug and cross-cut situated on the northwesterly point of the U. S. Naval Aviation Base at Squantum, Massachusetts. Station is very easily reached from Wollaston Boulevard, near the entrance to Airport. Station was occupied by a chest high tripod, and visibility is good generally in all directions.

Described by..... Marked by.....

GROUND TRANSFER POINT, "NECCO" MONUMENT No. 80 — (First order traverse point No. F2/0).
Description: This point is a C. P. B. disc set in a monument in gravel walk on Charles River Embankment opposite Sherborn Street, located as follows:
Northwest 42.85′ from north corner of stone bench.
Northeast 50.99′ from north corner of stone bench.
Southeast 12.81′ from west corner of rescue ladder.
Southwest 10.12′ from east corner of rescue ladder.

GROUND TRANSFER POINT, "NECCO" MONUMENT No. 81 — (First order traverse point No. F2/1).
Description: This point is a C. P. B. disc set in a monument of gravel walk near triangular grass plot.
Southeast 11.6′ from the L. O. C. of stone bench.
Southeast 9.5′ from R. O. C. of stone bench.
Southwest 17.5′ from the left post of rescue ladder.
Southwest 24.4′ from the right post of rescue ladder.


CAMBRIDGE, MASS:
STATION "NECCO"
TRANSFER - TRIANGLE
Necco
18.06
2.28
23.35
WATER TANK
BLANCHE ST.
PRIVATE WAY
Charlesgate Hospital
C.P.B. MON. "85"
C.P.B. DISC "86"
72.59
Cross M.H.
Lt. Pole 103
Vehicle Sign
Base Line
Grass & Gravel
MEMORIAL
Traffic
DRIVE
Cross Elec. Co. M.H.
Cross Lt. Pole "77"
Go Right Sign
ISLAND
Traffic
CHARLES
RIVER
Rescue Ladder
Grass Plot
Stone Bench
Rescue Ladder
GRAVEL WALK
Base Line
F 2/0
C.P.B. MON. "80"
C.P.B. MON. & DISC "81"
F 2/1
Grass Plot
Stone Bench
Stone Bench
Grass Plot
Sears
GRAVEL WALK
GRAVE WALK
BACK
ST.
SHERBORN ST.
DEERFILD ST.
RALEIGH ST.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: NECCO STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: CAMBRIDGE

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 1.8 meters.
Height of telescope above station mark meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Sears	1907.07		12 18 25.37
No Ref. Marks Ties only			

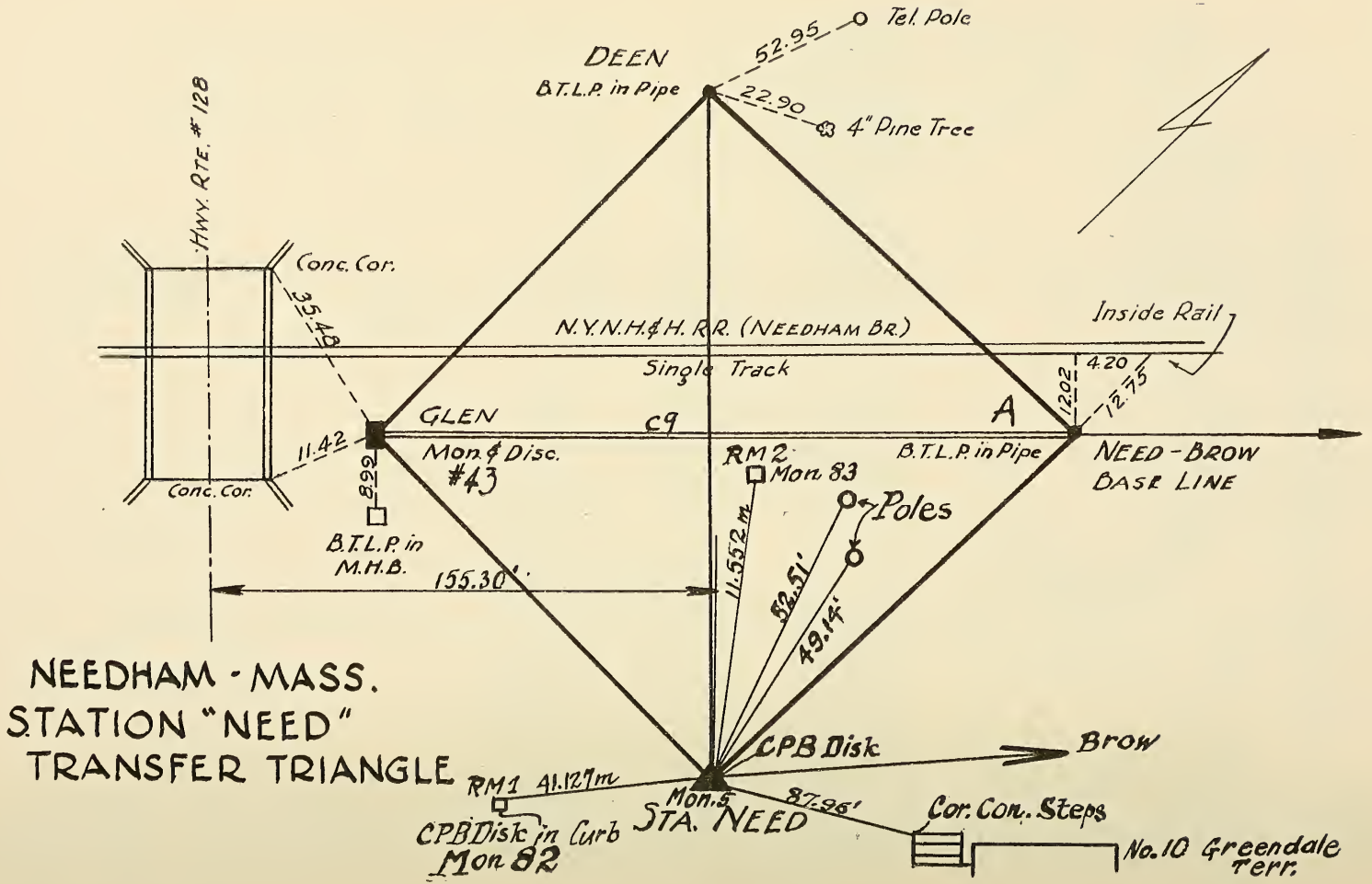
Detailed Description: A standard C. P. B. disc station mark set in a square block of concrete on the southern corner of the penthouse roof, beside the water tank, on the roof of the New England Confectionery Company (Necco), Massachusetts Avenue, Cambridge.

Located 18.06 feet southeast from inside corner of concrete railing block on west corner of penthouse; 23.35 feet southwest from inside corner of concrete railing block on east corner of penthouse; 2.28 feet from inside corner of concrete railing block on south corner of penthouse.

Described by JOHNSON Marked by.....

GROUND TRANSFER POINT, "NECCO" MONUMENT No. 85.
Description: This point is a C. P. B. disc set in monument located in the walk along the north side of Memorial Drive approximately 1400 feet west of Charlesgate Hospital.
North 44.775′ from "Go Right" sign at west end of Island.
Northeast 7.6′ from vehicle sign.
East 9.245′ from c. c. M. H.

GROUND TRANSFER POINT, "NECCO" C. P. B. DISC IN CURB No. 86.
Description: This point is a C. P. B. disc set flush with curb at corner of Memorial Drive and private way alongside of Charlesgate Hospital.
Southeast 72.59′ from nearest side of steps of Charlesgate Hospital.
West 3.55′ from c. c. Elec. Co. M. H.
Northwest 12.00′ from c. c. Lt. Pole No. 77.


DEEN
B.T.L.P. in Pipe
52.95
Tel. Pole
22.90
4" Pine Tree
HWY. RTE. #128
Conc. Cor.
35.48
N.Y.N.H.&H. R.R. (NEEDHAM BR.)
Single Track
Inside Rail
4.20
12.02
12.75
GLEN
℄
A
11.42
Mon. & Disc. #43
RM 2
Mon 83
B.T.L.P. in Pipe
NEED - BROW BASE LINE
Conc. Cor.
8.99
B.T.L.P. in M.H.B.
155.30'
Poles
11.552 m.
82.51'
49.14'
NEEDHAM - MASS.
STATION "NEED"
TRANSFER TRIANGLE
CPB Disk
Brow
RM 1 41.127m
Mon. 5
87.96'
Cor. Con. Steps
CPB Disk in Curb
Mon 82
STA. NEED
No. 10 Greendale Terr.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: NEED STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: NEEDHAM

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1, Note, disc in curb
Reference mark, No. 2, Note, 1a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 9.24 meters.
Height of telescope above station mark, 9.53 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Brow	1952.09	0 00 00	260 11 20.23
Ref. Mark, No. 1	41.127	177 52 45	78 04 05.23
Ref. Mark, No. 2	11.552	288 03 57	188 15 17.23

Detailed Description:

A C. P. B. standard disc set in a concrete monument about 6 inches above the ground on the Pickett property in the easterly part of Needham. The station is approximately 155.30 feet from the center line of Route 128 near the concrete highway bridge No. 2.36 over the Needham Branch of the N. Y., N. H. & H. R. R. It is 87.96 feet northwest of the westerly corner of the steps at the entrance to No. 10 Greendale Terrace. It is 49.14 feet from one and 52.51 feet from the other of two poles carrying high tension lines.

Station is reached from Spring Street, West Roxbury, over Needham Street and Great Plain Avenue, turning right at the traffic lights at the intersection of Route 128 and Great Plain Avenue and then about half a mile to the concrete highway bridge.

A 30-foot tower was used, and view is good in all directions except a small part of the southern quadrant where trees block the view.

Described by J. BULLMAN Marked by.....

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GLEN STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: J. M. DEARBORN YEAR: LOCALITY:

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1 Note*
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

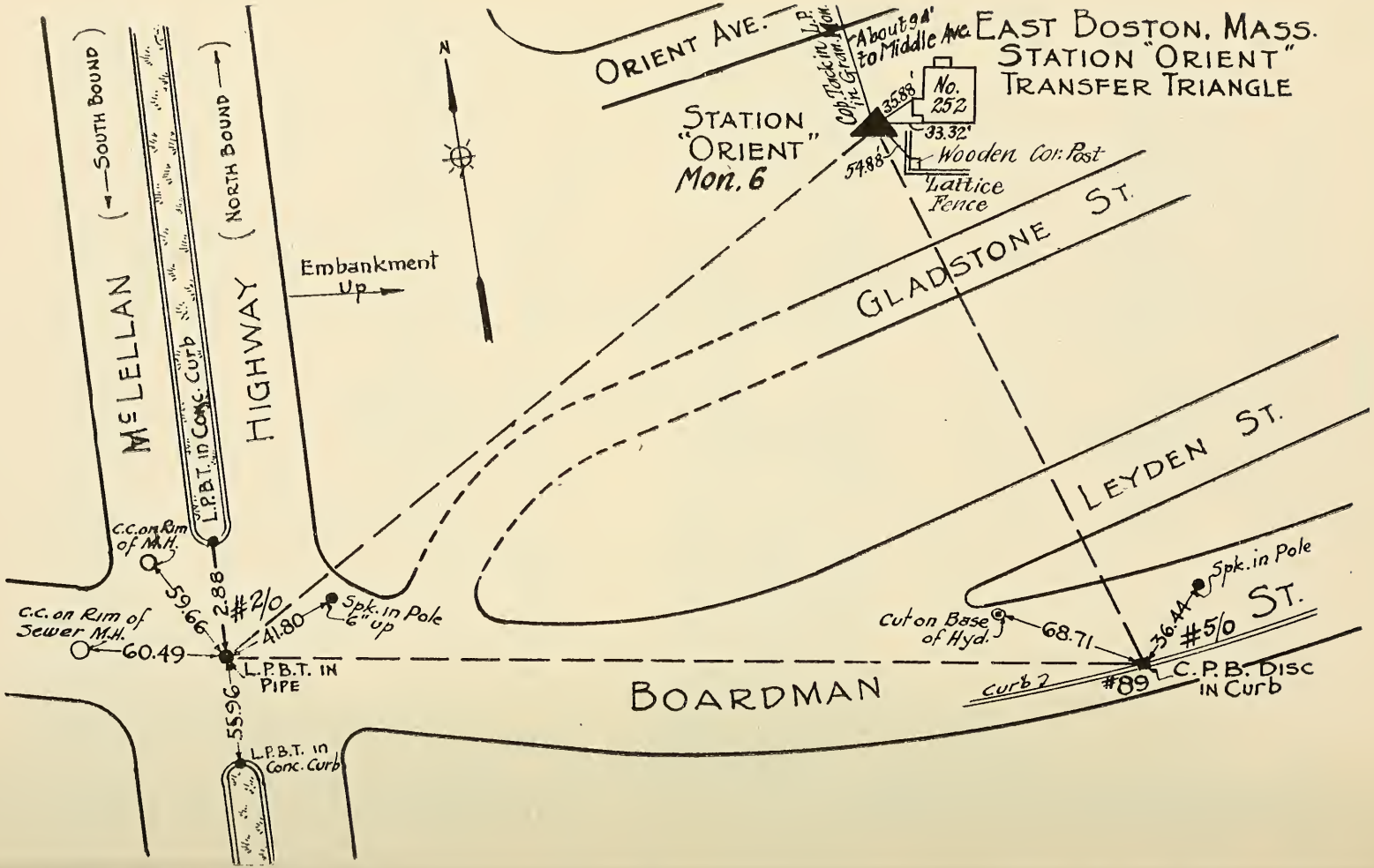
DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Need	Meters	00 00 00	314 14 28
Ref Mark No. 1	63.137	305 57 54	260 12 22
*Ref. Mark No. 1 is metal pipe flush w	a brass tac ith ground	k in lead pl	ug set in a

Detailed Description:

Station Glen is the westerly end of ground base No. 4, situated on the Needham branch of the N. Y., N. H. & H. R. R. in Newton. It is situated south of the R. R. track and approximately on line with the easterly side of bridge No. 2.36 of route No. 128; situated 8.99 feet northwest of M. H. B.; 11.42 feet northeast of southerly bridge abutment; 35.48 feet northwest of northerly bridge abutment. Station is marked by a monument and standard C. P. B. disc.

Described by H. ADELMAN Marked by.....


EAST BOSTON, MASS.
STATION "ORIENT"
TRANSFER TRIANGLE
ORIENT AVE.
About 9' to Middle Arc.
Cop. Tack in L.P. in Gran. Mon.
No. 252
35.83'
33.32'
Wooden Cor. Post
54.88'
Lattice Fence
STATION "ORIENT" Mon. 6
N
Embankment Up
McLELLAN HIGHWAY
(SOUTH BOUND)
(NORTH BOUND)
L.P.B.T. in Conc. Curb
GLADSTONE ST.
LEYDEN ST.
C.C. on Rim of M.H.
59.66
2.88
#2/0
41.80
Spk. in Pole 6" up
C.C. on Rim of Sewer M.H.
60.49
L.P.B.T. IN PIPE
55.96
L.P.B.T. in Conc. Curb
Cut on Base of Hyd.
68.71
36.44
Spk. in Pole
#5/0
ST.
BOARDMAN
Curb
#89
C.P.B. Disc IN Curb

(811)

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ORIENT STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1937 LOCALITY: EAST BOSTON

Surface-station, mark, Note, 0a
Underground-station mark, Note, None
Reference mark, No. 1 Note, 11a
Reference mark, No. 2 Note, 11a
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 4.10 meters.
Height of telescope above station mark, 4.24 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Ebhig 2	2300.44	0 00 00	59 07 30.51
Ref. Mark No. 1	9.09	72 37 20	131 44 50.51
Ref. Mark No. 2	9.11	341 38 05	40 45 35.51

Detailed Description:

A copper tack in lead plug set in a granite monument, the top of which is 4 inches above the ground.

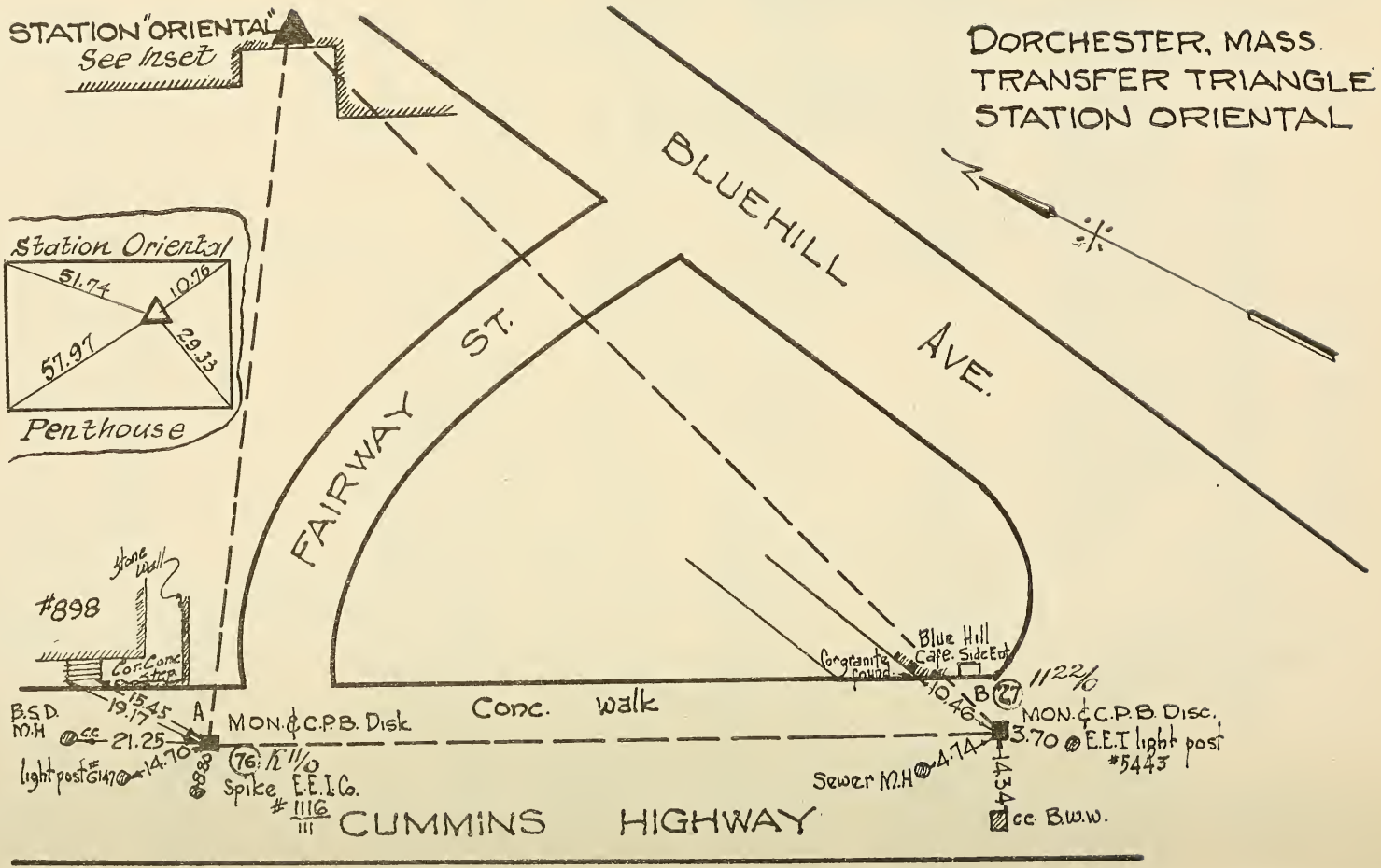
Located in the Orient Heights section of East Boston on the south side of Orient Avenue about 94 feet southwest of the center line, about 33 feet west of No. 252 Orient Avenue.

Station occupied by a 13 foot tower.

Described by JOHNSON Marked by.....

GROUND TRANSFER POINT "ORIENT" C. P. B. DISC No. 89 — (First order traverse point No. 5/0).
Description: This point is on Boardman Street, near Leyden Street, and consists of a disc set in curb on the south side of Boardman Street.
Southwest 36.44′ from spike in pole.
Southeast 68.71′ from c. c. on base of hydrant.

GROUND TRANSFER POINT "ORIENT" L. P. B. T. — (First order traverse point No. 2/0).
Description: This point consists of a L. P. B. T. located at the intersection of McClellan Highway and Boardman Street.
South 2.88′ from L. P. B. T. in curb of reservation.
East 60.49′ from c. c. or rim of M. H. (sewer).
North 55.96′ from L. P. B. T. in concrete curb of reservation.
Southwest 41.80′ from spike 6 inches up in pole.


DORCHESTER, MASS.
TRANSFER TRIANGLE
STATION ORIENTAL
STATION "ORIENTAL"
See Inset
BLUE HILL AVE.
FAIRWAY ST.
Station Oriental
51.74
10.76
57.97
29.33
Penthouse
#898
Stone Wall
Con. Conc. step
19.17
15.45
B.S.D. M.H
21.25
light post #G147
14.70
A
MON. & C.P.B. Disk
Conc. walk
Blue Hill Cafe. Side Ent.
Granite Coping
10.46
B
27
11 22/0
MON. & C.P.B. Disc.
3.70
E.E.I. light post #5443
Sewer M.H
4.74
1.43
4.34
cc B.W.W.
76
K 11/2
Spike
E.E.I.Co.
1116
III
CUMMINS HIGHWAY

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ORIENTAL, 1935 STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: R. A. CASWELL YEAR: 1935 LOCALITY: DORCHESTER

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Tucker	932.48		01 39 47.34

Detailed Description:

A nail in concrete on roof of penthouse on the top of Oriental Theatre in Mattapan Square. It is in southeast corner of roof, 7.5 feet from east edge and 7.8 feet from south edge; it is also 189 feet west of center line of Blue Hill Avenue and 180 feet north of center line of Fairway Street.

Described by H. E. MARSTON Marked by.....

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: ORIENTAL STATE: MASSACHUSETTS COUNTY: SUFFOLK
ESTABLISHED BY: R. A. CASWELL YEAR: 1935 LOCALITY: BOSTON (Dorchester)
RECOVERED BY: *J. M. DEARBORN YEAR: 1938

Detailed statement as to the fitness of the original description:

Station ORIENTAL of the Massachusetts Geodetic Survey was incorporated into the Boston City Planning Board—First Order Triangulation Scheme in 1938. The original description was found to be substantially correct but additional ties were taken as shown on the sketch. The position was transferred to the ground by means of a transfer triangle whose base lies on Cummins Highway.

The station was occupied by a breast high tripod and instrument.

Visibility is limited to a horizon of approximately two miles.

J. M. DEARBORN

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

GROUND TRANSFER POINT, "ORIENTAL" MONUMENT No. 76 — (First order traverse point No. K11/0).

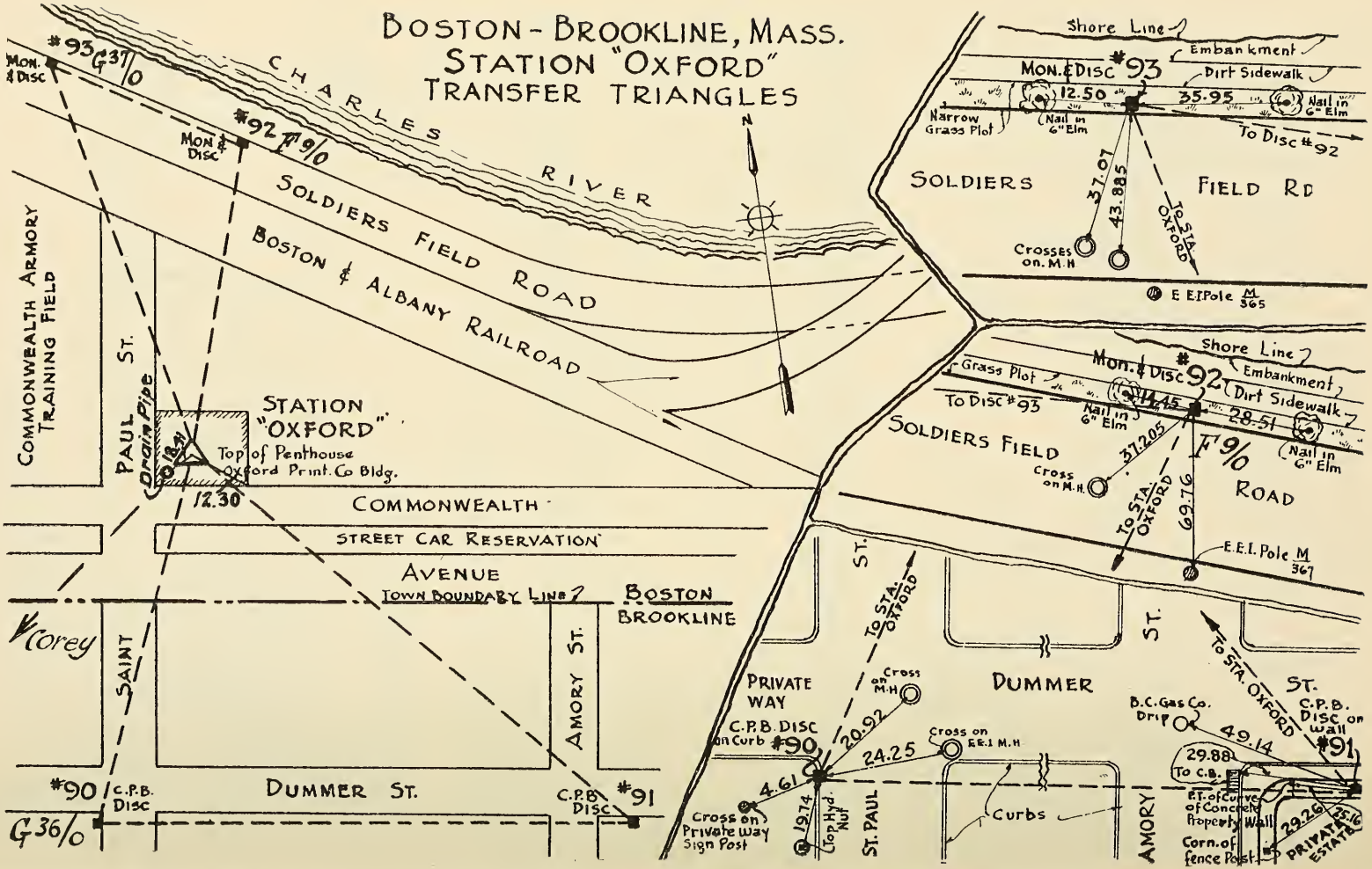
Description: This point is a C. P. B. disc set in a concrete monument flush with the concrete sidewalk on the northeast side of Cummins Highway opposite Fairway Street.

Northeast 8.80′ from spike in E. E. I. pole No. 1116/111.
Southeast 14.70′ from light post No. 6147.
Southeast 21.25′ from c. c. Boston Sewer Department M. H.
South 19.17′ from left corner of concrete steps at No. 498.
South 15.45′ from right corner of concrete steps at No. 498.

GROUND TRANSFER POINT, "ORIENTAL" MONUMENT No. 27 — (First order traverse point No. H22/0).

Description: This point is a C. P. B. disc set in a concrete monument flush with the concrete sidewalk on the northeast side of Cummins Highway near the intersection of Blue Hill Avenue.

Northeast 14.34′ from c. c. B. M. H.
Southeast 4.74′ from sewer M. H.
South 10.46′ from corner granite foundation.
North 3.70′ from E. E. I. light post No. 5443.


BOSTON - BROOKLINE, MASS.
STATION "OXFORD"
TRANSFER TRIANGLES
CHARLES RIVER
SOLDIERS FIELD ROAD
BOSTON & ALBANY RAILROAD
COMMONWEALTH ARMORY TRAINING FIELD
PAUL ST.
Drain Pipe
STATION "OXFORD"
Top of Penthouse Oxford Print. Co Bldg.
12.30
COMMONWEALTH AVENUE
STREET CAR RESERVATION
TOWN BOUNDARY LINE
BOSTON
BROOKLINE
Corey
SAINT
AMORY ST.
DUMMER ST.
#90 C.P.B. Disc
C.P.B. #91 Disc
G 36/0
#93 G 31/0
MON. & DISC
#92 F 9/0
MON. & DISC
N
Shore Line
Embankment
MON. & DISC #93
Dirt Sidewalk
12.50
35.95
Nail in 6" Elm
Narrow Grass Plot
Nail in 6" Elm
To Disc #92
SOLDIERS FIELD RD
37.07
43.885
To STA. OXFORD
Crosses on M.H
E E.I Pole M 365
Shore Line
Embankment
Grass Plot
MON. & DISC #92
Dirt Sidewalk
To Disc #93
11.45
28.51
Nail in 6" Elm
Nail in 6" Elm
SOLDIERS FIELD
37.205
F 9/0
ROAD
Cross on M.H
To STA. OXFORD
69.76
E.E.I. Pole M 367
ST.
To STA. OXFORD
ST.
To STA. OXFORD
ST.
PRIVATE WAY
Cross on M.H
DUMMER
B.C. Gas Co. Drip
C.P.B. Disc on wall #91
C.P.B. DISC on Curb #90
20.92
24.25
Cross on E.E.I M.H
49.14
29.88
To C.B.
4.61
Cross on Private Way Sign Post
19.74
Top Hyd. Nut
ST. PAUL
Curbs
AMORY
E.P. of Curve of Concrete Property Wall
29.26
35.16
Corn. of fence Post
PRIVATE ESTATE

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: OXFORD STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: DEMODENA YEAR: 1938 LOCALITY: BOSTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.385 meters.
Height of telescope above station mark, 1.675 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Corey	1822.92		55 52 20.35
No Ref. Marks			
Only Ties			

Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 4 inches above a tar and gravel roof on northeast corner of penthouse on northerly side of the Oxford printing building situated on the southerly side of the Charles River and the northerly side of Commonwealth Avenue in Boston, Mass. Visibility is excellent in all directions.

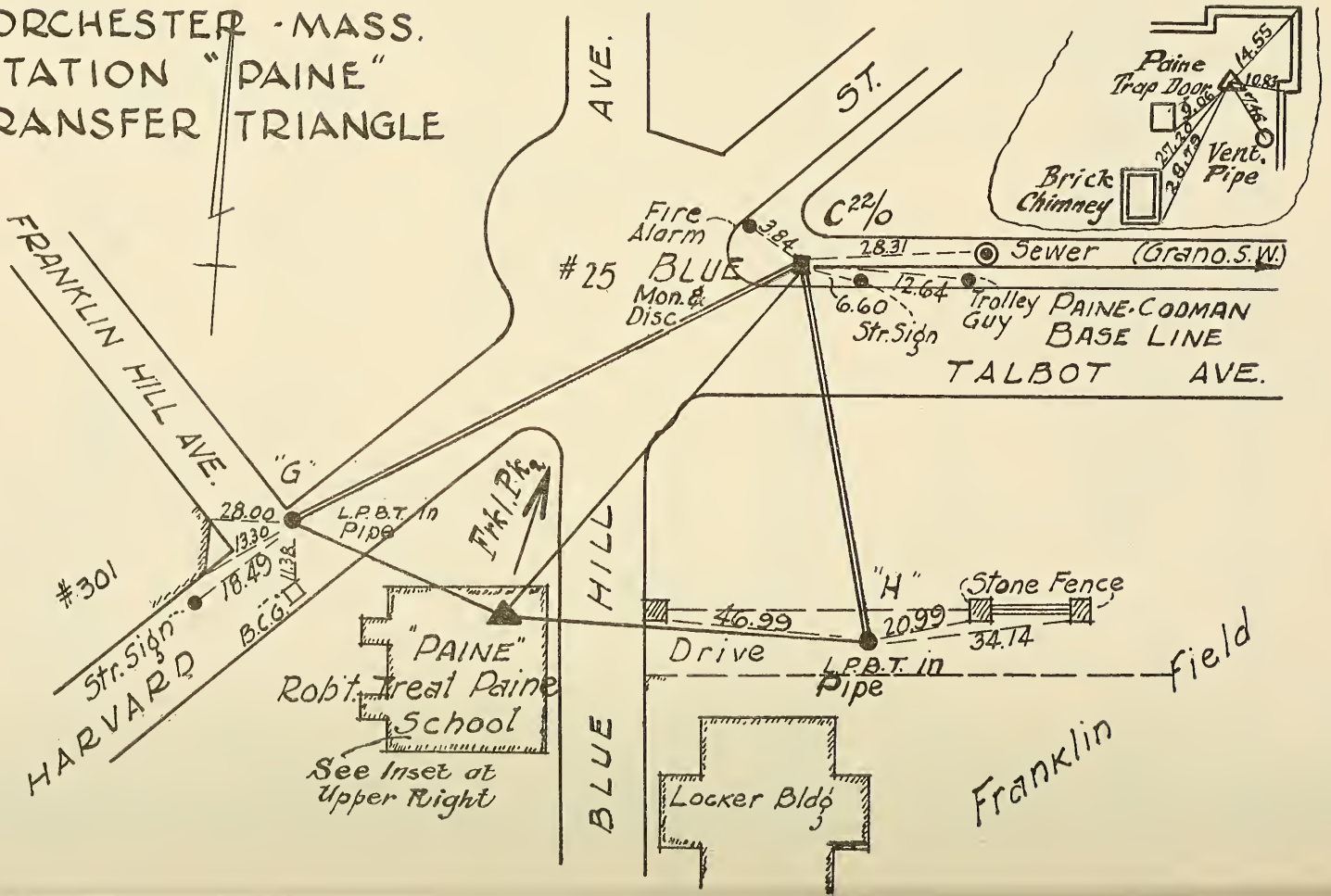
Described by LEO DEMODENA Marked by.....

GROUND TRANSFER POINT, "OXFORD" C. P. B. DISC IN CURB No. 90 — (First order traverse point No. G36/0).
Description: This point consists of a C. P. B. disc set in curb on the southwest side of Dummer Street and the west side of St. Paul Street.
West 24.25′ from c. c. on M. H. E. E. I. Co.
Southwest 20.92′ from c. c. on M. H.
East 4.61′ from c. c. on "Private Way" sign post, St. Paul Street.
North 19.74′ from top nut on hydrant.

GROUND TRANSFER POINT, "OXFORD" C. P. B. DISC ON WALL No. 91.
Description: This point is a C. P. B. disc set in concrete property wall, near the corner of Amory and Dummer Streets.
Northeast 29.26′ from corner of fence post.
East 25.16′ from P. T. of curve of concrete property wall.
Southeast 29.88′ from catch-basin.
Southeast 49.14′ from B. C. G. Co. drip.

GROUND TRANSFER POINT, "OXFORD" MONUMENT No. 93 — (First order traverse point No. G37/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground in grass reservation on the northwesterly side of Soldiers Field Road.
East 12.50′ from nail in 6″ elm tree.
West 35.95′ from nail in 6″ elm tree.
North 37.07′ from c. c. on M. H.
Northwest 43.88′ from c. c. on sewer.

GROUND TRANSFER POINT, "OXFORD" MONUMENT No. 92 — (First order traverse point No. F9/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground in grass reservation on the northwesterly side of Soldiers Field Road.
North 69.76′ from base of E. E. I. pole M/367.
West 28.51′ from nail in 6″ elm tree.
East 14.45′ from nail in 6″ elm tree.
Northeast 37.205′ from c. c. on rim of M. H.


DORCHESTER - MASS.
STATION "PAINE"
TRANSFER TRIANGLE
AVE.
ST.
Paine Trap Door
14.55
10.83
9.06
7.46
27.20
29.72
Vent. Pipe
Brick Chimney
Fire Alarm
3.84
C 22/0
#25 BLUE
18.31
Sewer (Grano. S.W.)
Mon. & Disc.
12.64
6.60
Str. Sign
Trolley
PAINE-CODMAN
Guy
BASE LINE
TALBOT AVE.
FRANKLIN HILL AVE.
"G"
28.00
13.30
18.49
1.38
L.P.B.T. in Pipe
Fnk'l. Pk.
#301
Str. Sign
HARVARD
B.C.G.
"PAINE"
Robt. Treat Paine
School
See Inset at Upper Right
HILL
"H"
Stone Fence
46.99
20.99
34.14
Drive
L.P.B.T. in Pipe
Field
BLUE
Locker Bldg.
Franklin

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PAINE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.37 meters.
Height of telescope above station mark, 1.66 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Franklin Pk2	1045.05		196 47 35.85
No Ref. Marks Ties only			

Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 3 inches above the tar and gravel roof at the northeast corner of the Robert Treat Paine School on Blue Hill Avenue, Dorchester. The schoolhouse is located opposite the Field House at Franklin Field, at the junction of Harvard Street and Blue Hill Avenue.

The view is good in all directions but the length of sights would be limited.

Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "PAINE" "BLUE" MONUMENT No. 25 — (First order traverse point No. C22/0).

Description: This point is a C. P. B. disc in a monument set flush with the concrete sidewalk, located at the northeast corner of the intersection of Harvard Street and Talbot Avenue.

Southeast 3.84′ from c. c. on base of fire box signal.
Southwest 28.31′ from sewer M. H.
East 12.64′ from c. c. on base of trolley guy pole No. 232/4.
Northeast 6.60′ from street sign.

GROUND TRANSFER POINT, "PAINE" L. P. B. T. PT. "H".

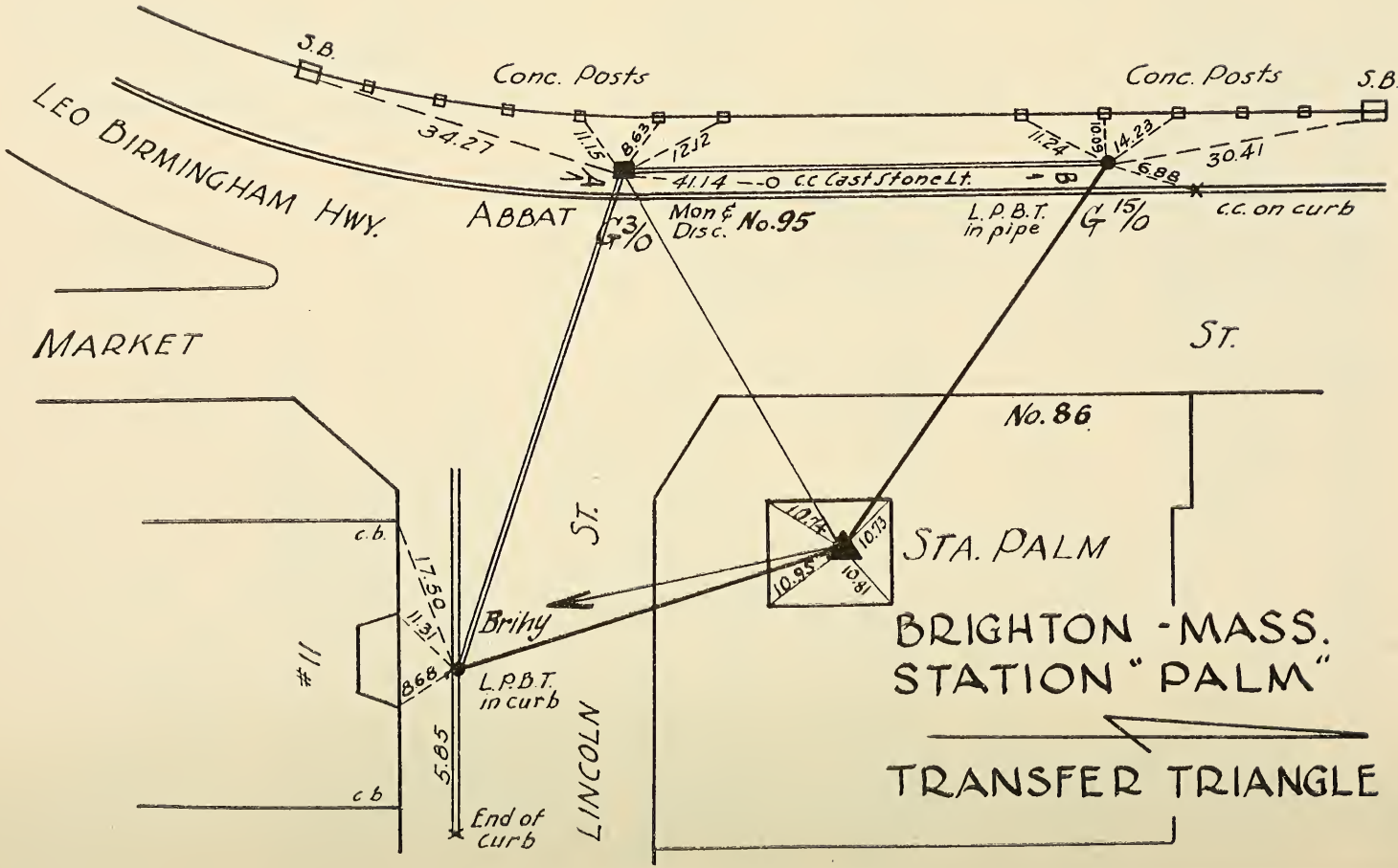
Description: This point is a L. P. B. T. in a pipe in the drive near the Locker Building in Franklin Field.

Southeast 46.99′ from base granite wall.
Southwest 20.99′ from base granite wall stone fence.
Southwest 34.14′ from base granite wall stone fence.

GROUND TRANSFER POINT, "PAINE" L. P. B. T. PT. "G".

Description: This point is a L. P. B. T. in a pipe at the north corner of the intersection of Harvard Street and Franklin Hill Avenue.

North 11.38′ from B. C. G.
Northeast 18.49′ from street sign.
Northeast 13.30′ from left side No. 301 Harvard Street.
East 28.00′ from right side No. 301 Harvard Street.


S.B.
Conc. Posts
Conc. Posts
S.B.
34.27
11.15
8.63
12.12
11.24
10.09
14.23
30.41
6.88
41.14 -- 0 c.c Cast Stone Lt.
B
A
LEO BIRMINGHAM HWY.
ABBAT
Mon & Disc. No. 95
L.P.B.T. in pipe
c.c. on curb
MARKET
ST.
No. 86
c.b.
17.59
11.31
8.68
Brihy
L.P.B.T. in curb
ST.
STA. PALM
10.14
10.73
10.95
10.81
BRIGHTON - MASS.
STATION "PALM"
TRANSFER TRIANGLE
LINCOLN
50.5
End of curb
c.b.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PALM STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. MAGUIRE YEAR: 1938 LOCALITY: BRIGHTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.76 meters.
Height of telescope above station mark, 2.05 meters.
Detailed Description:

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Brihy	1083.22		355 36 36.18
No. Ref. Marks			
Ties only			

A C. P. B. brass disc set in concrete pimple which is set on a tar and gravel stairway penthouse roof. Located at No. 86 Market Street, corner of Lincoln Street, Allston.

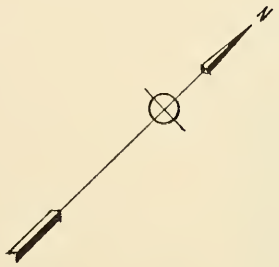
Station is located 10.95 feet from north of south corner of roof, 10.74 feet east of the west corner, 10.75 feet south from the north corner, 10.81 feet west of the east corner.

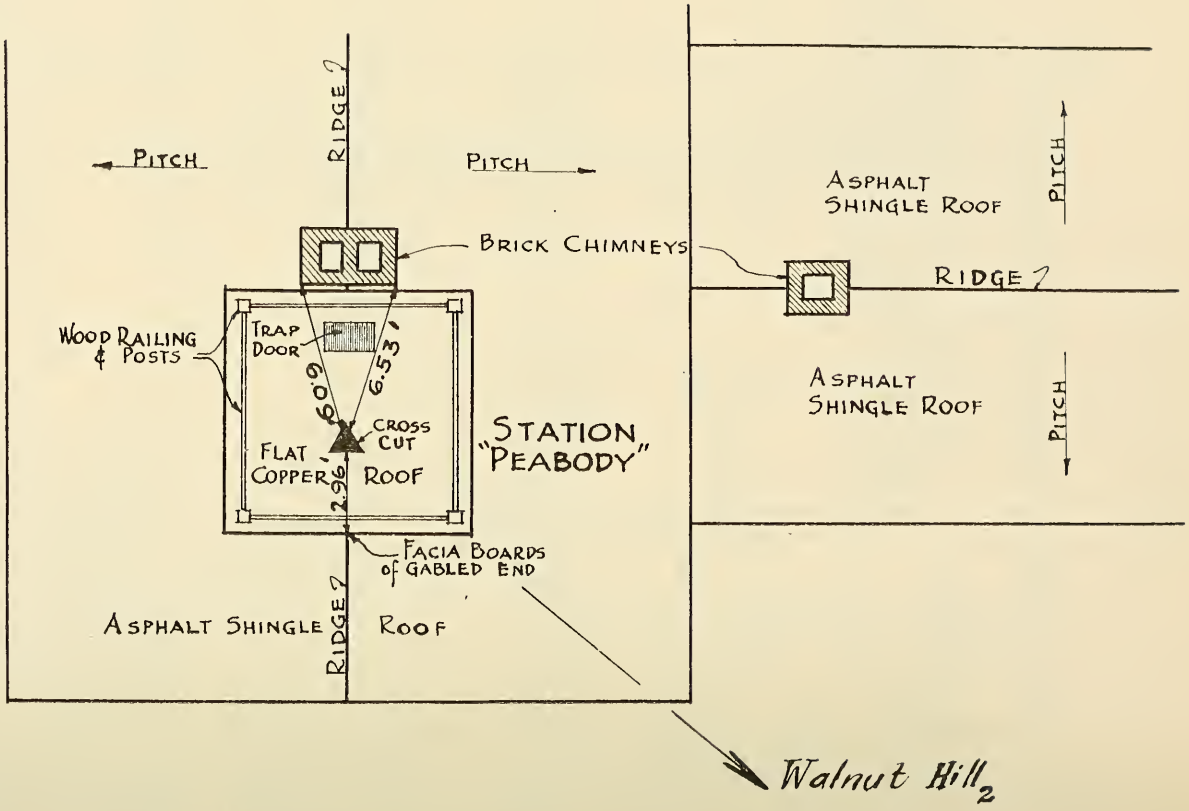
Described by J. MAGUIRE Marked by.....

GROUND TRANSFER POINT, "PALM" "ABBAT" MONUMENT No. 95 — (First order traverse point No. G3/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the northwest corner of the intersection of Leo Birmingham Parkway and Market Street. This point is also the westerly end of the Palm — Lincoln ground base.
South 41.14′ from c. c. on light post (cast stone).
Northeast 34.27′ from stone bound on Parkway.
Northeast 11.15′ from concrete post.
Southeast 8.63′ from concrete post.
Southeast 12.12′ from concrete post.

GROUND TRANSFER POINT, "PALM" L. P. B. T. — (First order traverse No. G15/0).
Description: This point is a L. P. B. T. in a pipe driver flush with sidewalk on the west side of Market Street near Lincoln Street.
Northeast 11.24′ from corner concrete fence post.
East 10.09′ from concrete fence post.
Southeast 14.23′ from concrete fence post.
Southwest 6.88′ from c. c. on curb.

GROUND TRANSFER POINT, "PALM" L. P. B. T. PT. "C".
Description: This point is a L. P. B. T. in curb on the south side of Lincoln Street near Market Street and Leo Birmingham Highway.
Northwest 8.68′ from east side of niche at No. 11.
Northeast 11.31′ from west side of niche at No. 11.
East 17.50′ from west corner board at No. 11.


N


PITCH
RIDGE?
PITCH
BRICK CHIMNEYS
WOOD RAILING & POSTS
TRAP DOOR
6.53'
6.0.6
CROSS CUT
FLAT COPPER ROOF
2.96'
STATION "PEABODY"
FACIA BOARDS of GABLED END
ASPHALT SHINGLE ROOF
RIDGE?
ASPHALT SHINGLE ROOF
PITCH
RIDGE?
ASPHALT SHINGLE ROOF
PITCH
Walnut Hill

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PEABODY STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: NEWTON

Surface-station mark, See below Note, Cross Cut
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 1.69 meters.

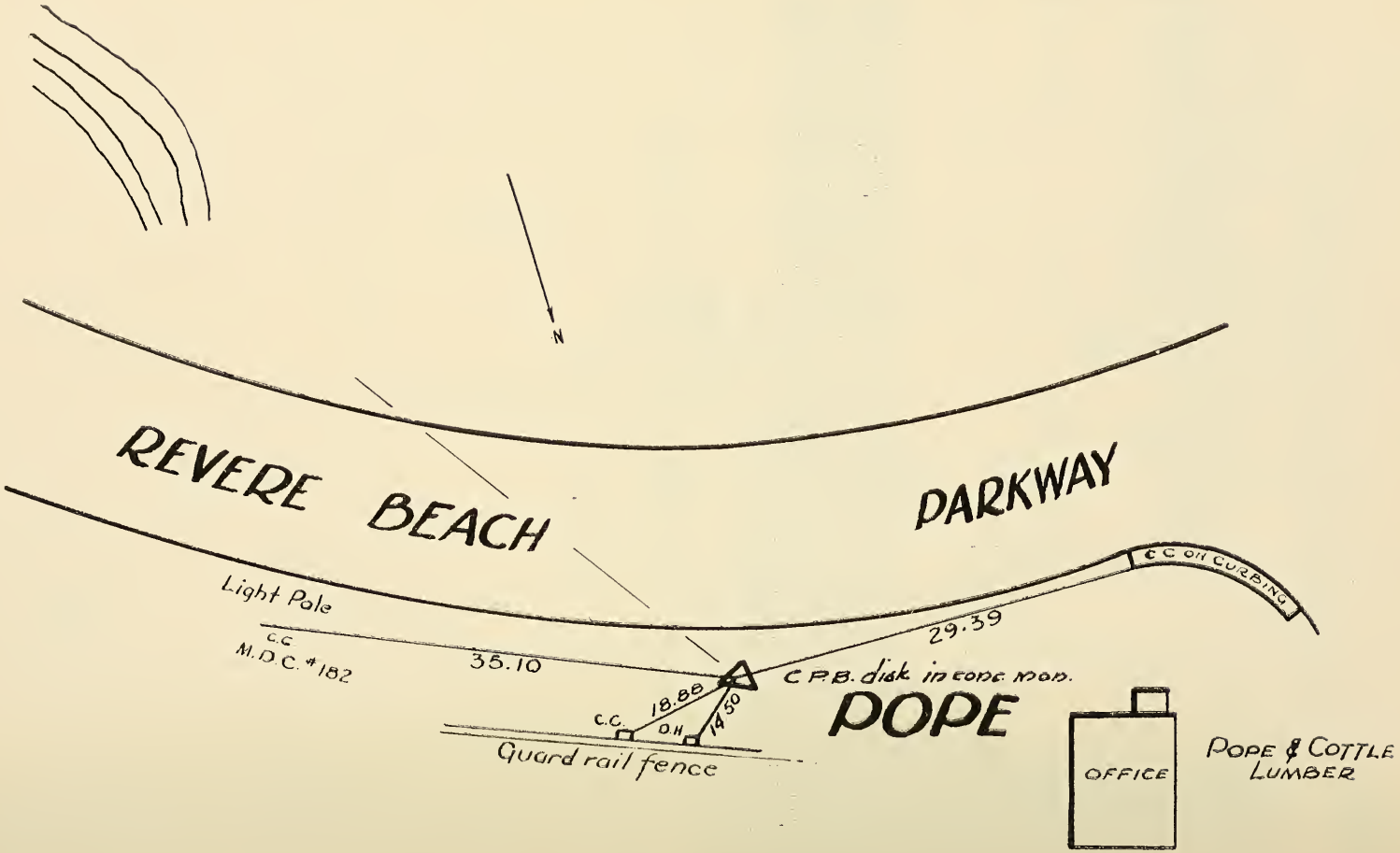
DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Walnut Hill 2 No Ref. Marks Ties only	2557.38		264 11 38.87

Detailed Description:

A cross cut scratched in copper roof of what is called the Bigelow House of the Peabody Home for Crippled Children, 474 Brookline Street, Newton, Mass. The station mark is located approximately in the center of the small flat roof at the westerly end of the building; the ties for which are shown on the accompanying sketch. Visibility is good in all directions provided that a 10-foot platform and tripod is used. Station is best reached by taking Brookline Street from the traffic circle at Hammond Pond Parkway and Hammond Street in Brookline and continuing westerly approximately three quarters of a mile to drive marked by sign and leading to the Peabody Home and Bigelow House on high hill at rear of property.

Described by J. M. DEARBORN Marked by.....


N
REVERE BEACH PARKWAY
C C on curbing
Light Pole
C.C.
M.D.C. #182
35.10
29.39
C.P.B. disk in conc. mon.
18.88
14.50
C.C.
D.H.
POPE
Guard rail fence
OFFICE
POPE & COTTLE LUMBER

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: POPE
CHIEF OF PARTY: JOHNSON

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1937 LOCALITY: CHELSEA

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, No. 1 Note, 11a
Reference mark, No. 2 Note, 11a
Azimuth mark, Note, None
Witness mark, Note
Height of light above station mark, 2.1 meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Orient	2111.68	0 00 00	325 31 43.88
Ref. Mark No. 1	13.05	37 37 30	3 09 13.88
Ref. Mark No. 2	21.63	126 34 40	92 06 23.88

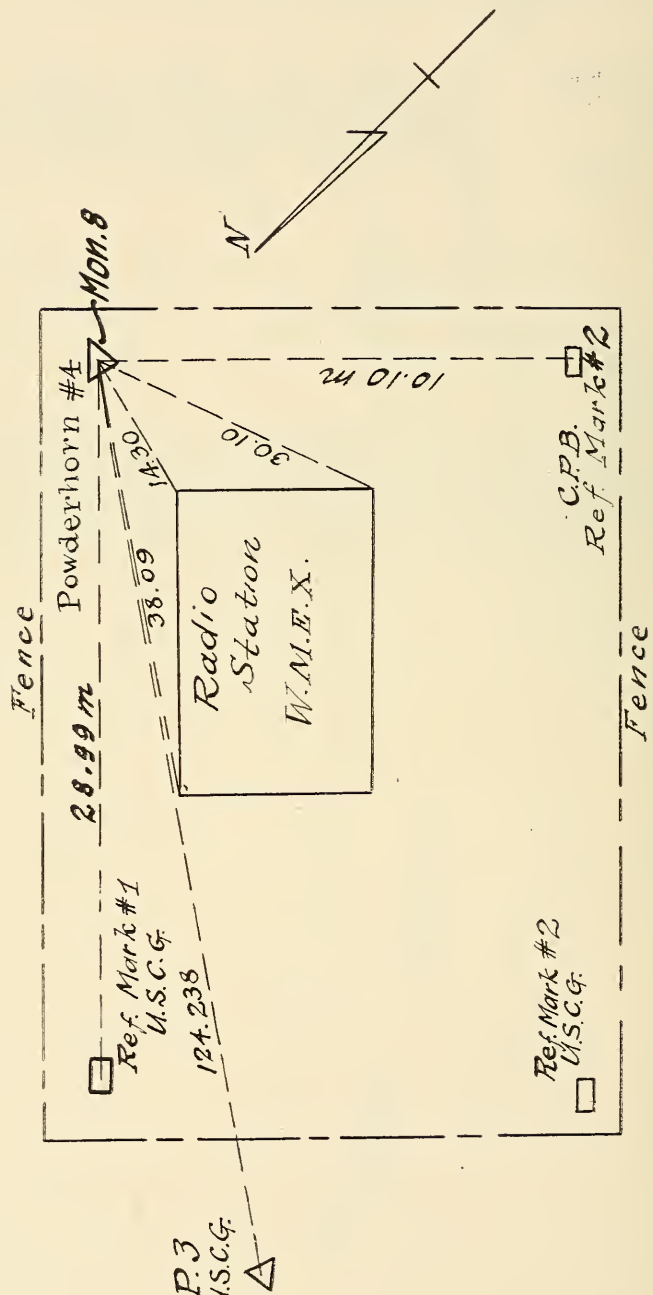
Detailed Description:

A bronze C. P. B. disc set in a concrete monument, the top of which is flush with ground.

Located on the north sidewalk of Revere Beach Parkway, approximately 50 feet southeast of Pope and Cottle Lumber Office Building, about 35 feet northwest of M. D. C. light pole No. 182. Located 186 feet west of the center line of Borden Street and Revere Beach Parkway.

This station is the northwesterly end of the base and occupied from the ground. Signaled with light on 8.0 foot tripod.

Described by H. F. JOHNSON Marked by.....


N
MON. 8
Powderhorn #4
Fence
28.99 m
Ref. Mark #1
U.S.C.G.
124.238
P.3
U.S.C.G.
38.09
14.30
10.30
24 01.01
Radio
Station
W.N.E.X.
C.P.B.
Ref. Mark #2
Ref. Mark #2
U.S.C.G.
Fence

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: POWDERHORN No. 4 STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: CHELSEA

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, No. 1 Note, 13a
Reference mark, No. 2 Note, 11a
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 2.10 meters.
Height of telescope above station mark, 2.50 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Orient	1921.47	0 00 00	303 36 59.56
Ref. Mark No. 1	28.99	176 22 35	119 59 34.56
Ref. Mark No. 2	10.10	87 20 40	30 59 39.56
Note: Reference Mark No. 1 is U. S. C. G. Reference Mark also, with arrow pointing to U. S. C. G. Station Powderhorn No. 3.			

Detailed Description:

A standard disc station mark set in a square block of concrete flush with the ground, on Powderhorn Hill inside the fence enclosing Radio Station WMEX in Chelsea.

Located in the eastern corner of fenced enclosure about 3 feet off each fence; 30.10 feet northeast from south corner of building; 14.30 feet east from east corner of building; 38.09 feet east from north corner.

Described by H. F. JOHNSON Marked by.....

HIGHWAY
ST ANNAFRAN
ROAD
No.32
R 12/6 QUARRY MON.9
350'
PLEASANTVIEW ST.
CUMMINS
ROANOKE
Heart
N

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION, QUARRY STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: HYDE PARK

Surface-station mark, Note, 2
Under ground-station mark. Note, None
Reference mark, No. 1 Note, 12b
Reference mark, No. 2 Note, 12b
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, meters.
Height of telescope above station mark, 1.7 meters.

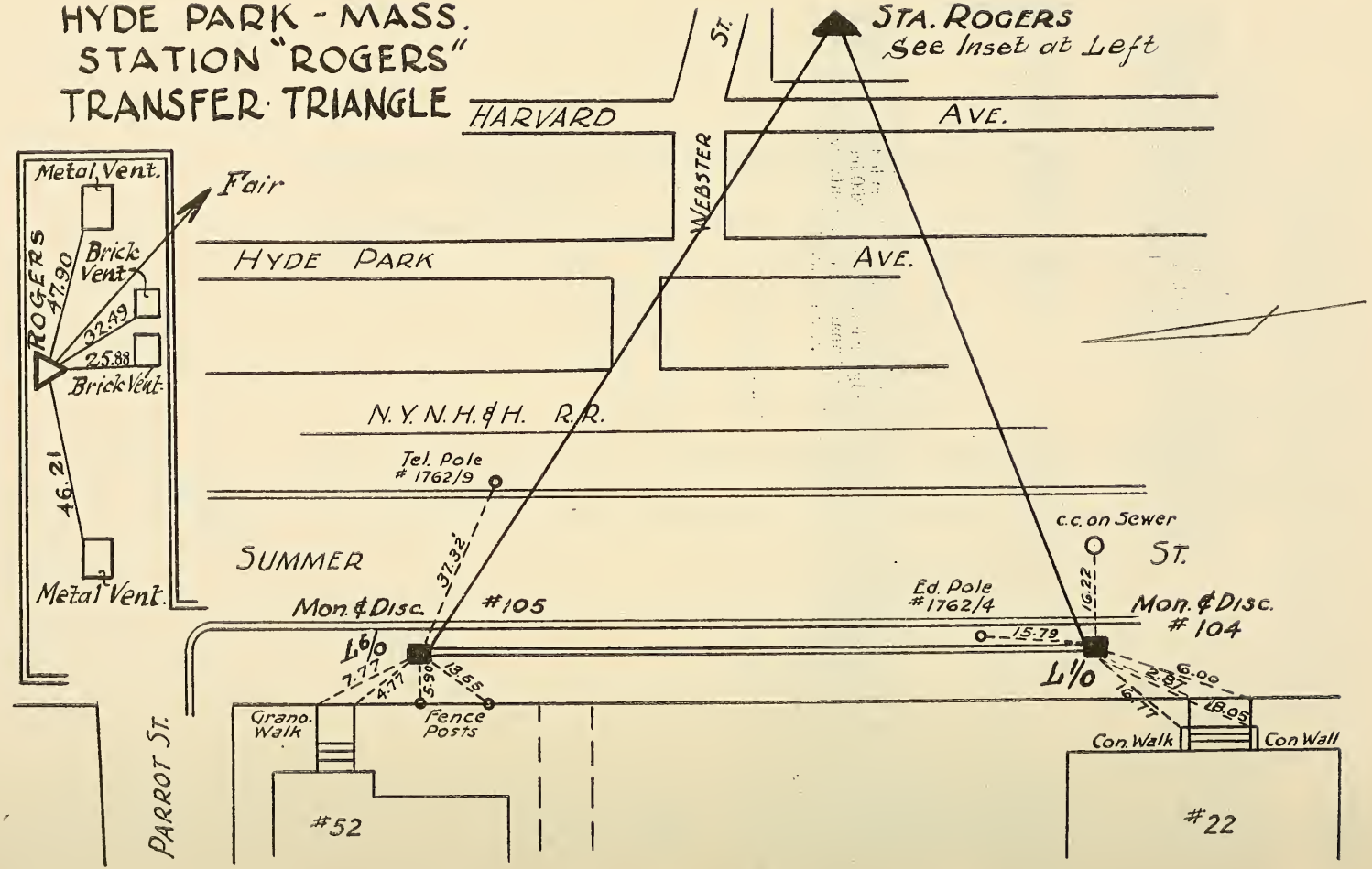
DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Heart	1492.39	0 00 00	145 54 18.43
Ref. Mark No. 1	18.59	18 03 30	163 57 48.43
Ref. Mark No. 2	15.55	249 23 50	35 18 08.43

Detailed Description:

A standard C. P. B. disc stamped Quarry set in the high point of an outcropping of weathered ledge running approximately north and south 50 to 60 feet in extent. This ledge is the largest and southernmost on the south side of the hill. The ledge is located about 350 feet from Roanoke Road, Hyde Park. Roanoke Road is reached by either Annafran or Pleasantview Streets which run southerly from Cummings Highway, Hyde Park. Station is located on what is known as the Eugene Foss Property.

Described by H. F. JOHNSON Marked by.....


HYDE PARK - MASS.
STATION "ROGERS"
TRANSFER TRIANGLE
HARVARD
ST.
STA. ROGERS
See Inset at Left
AVE.
WEBSTER
Metal Vent.
Fair
ROGERS
47.90
Brick Vent
32.49
25.88
Brick Vent
HYDE PARK
AVE.
N.Y.N.H.&H. R.R.
Tel. Pole
1762/9
46.21
Metal Vent.
SUMMER
37.32
Mon. & Disc.
#105
c.c. on Sewer
ST.
Ed. Pole
#1762/4
16.22
Mon. & Disc.
104
15.79
L 6/0
7.77
4.77
5.90
13.65
Grano. Walk
Fence Posts
L 1/0
2.87
6.00
16.77
18.95
Con. Walk
Con Wall
PARROT ST.
#52
#22

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ROGERS STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: HYDE PARK

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.735 meters.
Height of telescope above station mark, 5.02 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Fair	1197.99		340 32 02.74
No Ref. Marks Ties only			

Detailed Description:

Station Rogers is a standard C. P. B. disc set in a concrete pimple 4 inches above a tar and gravel roof of the William Barton Rogers School in Hyde Park.

Station is located 47.90 feet from the north corner of a metal ventilator in a northerly direction; 32.49 feet from the north corner of a brick ventilator in a northerly direction; 25.88 feet from the north corner of a brick ventilator in an easterly direction, and 46.21 feet from the east corner of a metal ventilator in an easterly direction. Station is located on the Webster street side of the school.

Visibility is good in all but a southeasterly direction where the view is blocked by a neighboring hill.

Described by J. MAGUIRE Marked by.....

GROUND TRANSFER POINT, "ROGERS" MONUMENT No. 105 — (First order traverse No. L6/0).

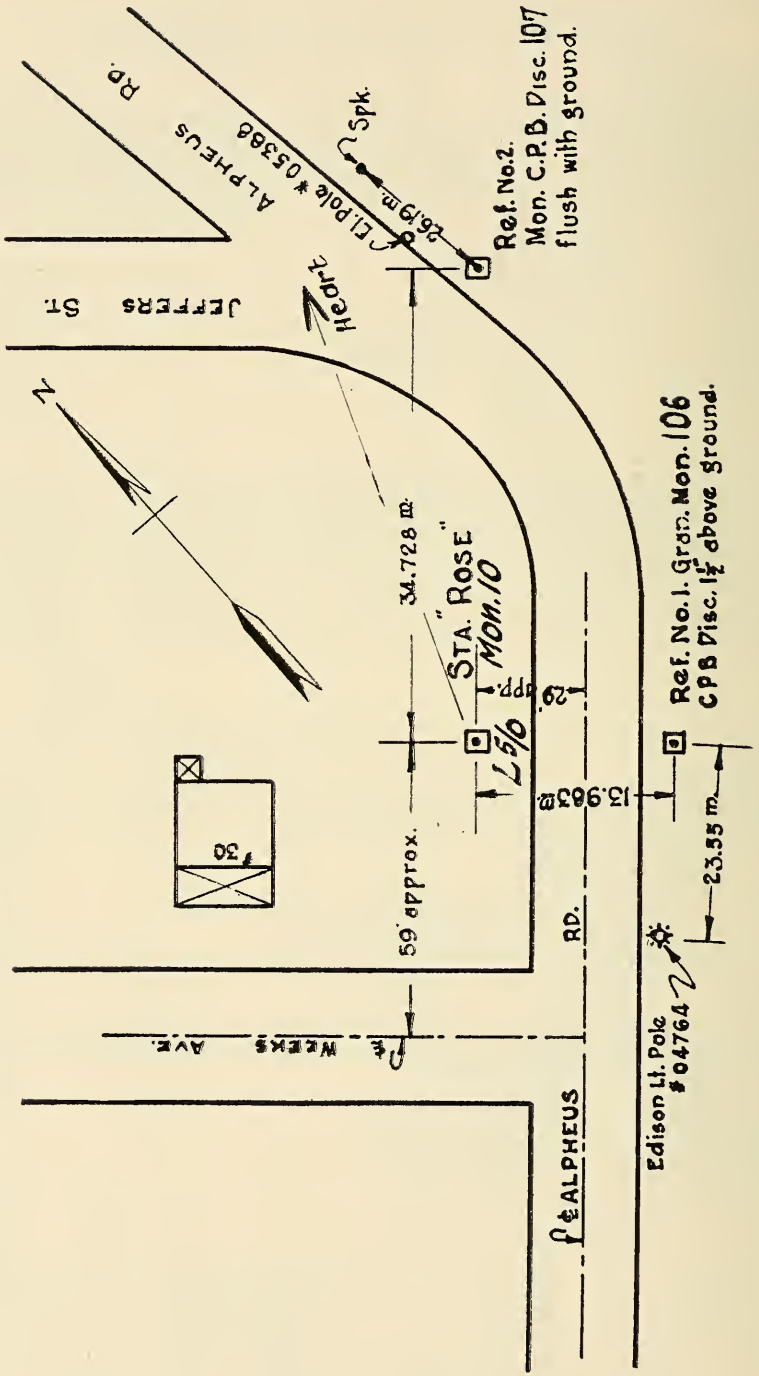
Description: This point is a C. P. B. disc set in a concrete monument, the top of which is 1 inch below the asphalt sidewalk located on the westerly side of Summer Street in Hyde Park opposite entrance to No. 52 Summer Street.

Northeast 13.55′ from fence post.
East 5.90′ from fence post.
Southeast 4.77′ from south corner of granolithic walk to No. 52.
Southeast 7.77′ from north corner of granolithic walk to No. 52.

GROUND TRANSFER POINT, "ROGERS" MONUMENT No. 104 — (First order traverse point No. L./0).

Description: This point is a C. P. B. disc set in a concrete monument, the top of which is flush with the asphalt sidewalk, located on the westerly side of Summer Street.

South 15.79′ from Ed. pole No. 1762/4.
West 16.22′ from c. c. on sewer.
Northeast 6.00′ from corner of walk to No. 22.
Northeast 2.87′ from corner of walk to No. 22.
Northeast 18.05′ from corner of steps to No. 22.
Northeast 16.77′ from corner of steps to No. 22.


Ref. No.2.
Mon. C.P.B. Disc. 107
flush with ground.
Spk.
26.19 m.
El. pole #05368
ALPHEUS
R.R.
JEFFERS St
Hedge
N
34.728 m.
STA. "ROSE"
MON. 10
29.
APP.
1.5%
13.963 m.
Ref. No.1. Gran. Mon. 106
C.P.B. Disc. 1½" above ground.
23.55 m.
59' approx.
RD.
WEEKS AVE.
ALPHEUS
Edison Lt. Pole
#04764
30'

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ROSE
CHIEF OF PARTY: JOHNSON

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No 1, Note, 11a
Reference mark, No.2, Note, 11a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.05 meters.
Height of telescope above station mark, 4.34 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

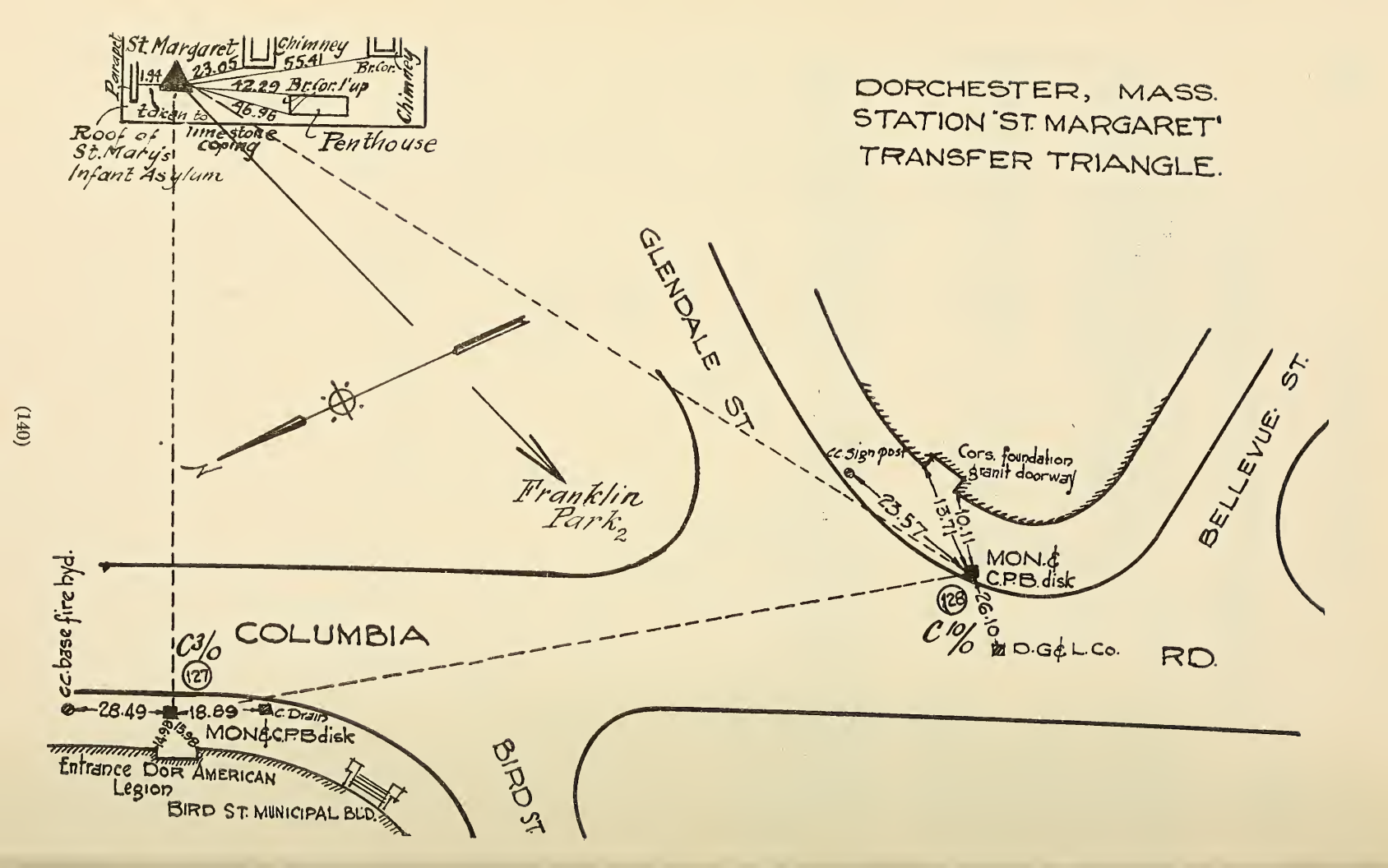
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Heart	1318.14	0 00 00	202 08 25.09
Ref. Mark No. 1	34.728	43 26 33	245 34 58.09
Ref. Mark No. 2	13.983	130 18 45	332 27 10.09

Detailed Description:

A standard C. P. B. disc station mark stamped Rose. Mon. No. 10 set in a square post of concrete on the north side of Alpheus Road, between Weeks Avenue and Jeffers Street.

Monument is set flush with the ground about 6 feet above grade of center line of street opposite monument. Located approximately 29 feet off center line of Alpheus Road and 60 feet northerly off center line of Weeks Avenue.

Described by JOHNSON Marked by.....


DORCHESTER, MASS.
STATION 'ST. MARGARET'
TRANSFER TRIANGLE.
St. Margaret
Chimney
Chimney
Br. Cor.
Br. for l'up
Parapet
23.05
55.41
12.29
46.96
1.94
taken to
Roof of St. Mary's Infant Asylum
limestone coping
Penthouse
GLENDALE ST.
Franklin Park
cc. Sign post
Cors. foundation
granit doorway
23.57
13.71
10.11
MON.¢ C.P.B. disk
BELLEVUE ST.
C3/0
COLUMBIA
127
128
C10/0
26.10
D.G¢L.Co.
RD.
cc. base fire hyd.
28.49
18.89
c. Drain
MON&C.P.B disk
14.98
13.98
Entrance DOR AMERICAN Legion
BIRD ST. MUNICIPAL BLD.
BIRD ST.

(140)

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ST. MARGARET STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: BULLMAN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Franklin Park 2 No. Ref. Marks Ties only	2155.75		53 26 03.99

Detailed Description:

A bronze C. P. B. disc, set in a concrete pimple, the top of which is 4 inches above the tar and gravel roof of the building known as St. Mary's Infant Asylum in the St. Margaret's Hospital group of buildings. This building is the most northerly of the group and is located on the top of a hill in northeastern Dorchester, formerly known as Jones' Hill. It is reached by following Cushing Avenue from Columbia Road, near Uphams Corner. The station is located at the northerly end of the roof about 1½ feet from the parapet wall.

The view is good from southwest through north to southeast, the view from southeast to southwest being blocked by penthouses and nearby buildings.

Described by BULLMAN Marked by.....

GROUND TRANSFER POINT, "ST. MARGARET" MONUMENT No. 127 — (First order traverse point No. C3/0).

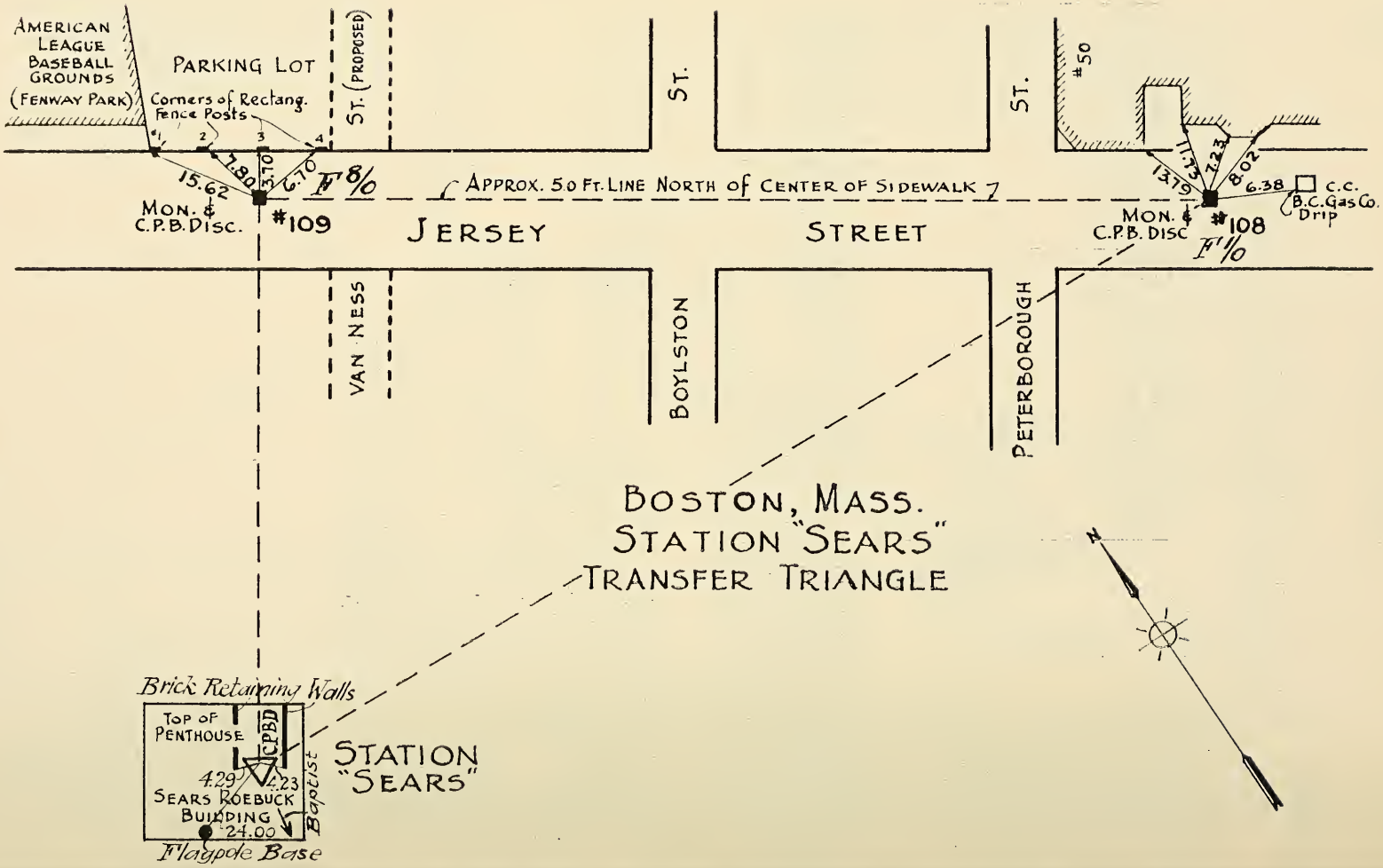
Description: This point is a C. P. B. disc set in a monument flush with sidewalk located on Columbia Road, near Bird Street, in front of Municipal Building.

South 28.49′ from c. c. base of fire hydrant.
North 18.89′ from c. drain.
East 15.98′ from south side entrance door American Legion.
East 14.98′ from north side entrance door American Legion.

GROUND TRANSFER POINT, "ST. MARGARET" MONUMENT No. 128 — (First order traverse point No. C10/0).

Description: This point is a C. P. B. disc located at the junction of Glendale and Bellevue Streets and Columbia Road.

Southwest 23.57′ from c. c. on sign post marked Glendale.
West 13.71′ from corner foundation granite doorway.
West 10.11′ from corner foundation granite doorway.
East 26.10′ from D. G. & L. Co.


AMERICAN LEAGUE BASEBALL GROUNDS (FENWAY PARK)
PARKING LOT
Corners of Rectang. Fence Posts
#1
2
3
4
ST. (PROPOSED)
ST.
ST.
#50
15.62
7.80
3.70
6.70
11.73
7.23
8.02
13.79
6.38
C.C.
B.C. Gas Co. Drip
APPROX. 5.0 FT. LINE NORTH of CENTER of SIDEWALK
MON. & C.P.B. DISC.
#109
JERSEY STREET
MON. & C.P.B. DISC
#108
VAN NESS
BOYLSTON
PETERBOROUGH
BOSTON, MASS.
STATION "SEARS"
TRANSFER TRIANGLE
Brick Retaining Walls
TOP OF PENTHOUSE
C.P.B.D.
4.29
4.23
SEARS ROEBUCK BUILDING
24.00
Flagpole Base
STATION "SEARS"
N

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SEARS STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: DEARBORN YEAR: 1938 LOCALITY: BROOKLINE

Surface-station mark, Note 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Baptis	1689.67		14 31 20.13
No ref. Marks			
Ties only			

Detailed Description:

A C. P. B. disc set in concrete 4 inches above a tar and gravel roof of the highest penthouse of the Sears and Roebuck Building, Brookline Avenue and Park Drive, Brookline, Mass. Station mark is located on the northeasterly corner of the roof and is surrounded on three sides by the 8-foot parapet wall surrounding the roof and the retaining walls shown on the sketch of ties. Visibility is good in all directions.

Described by J. MAGUIRE Marked by.....

GROUND TRANSFER POINT, "SEARS" MONUMENT No. 109 — (First order traverse point No. F8/0).

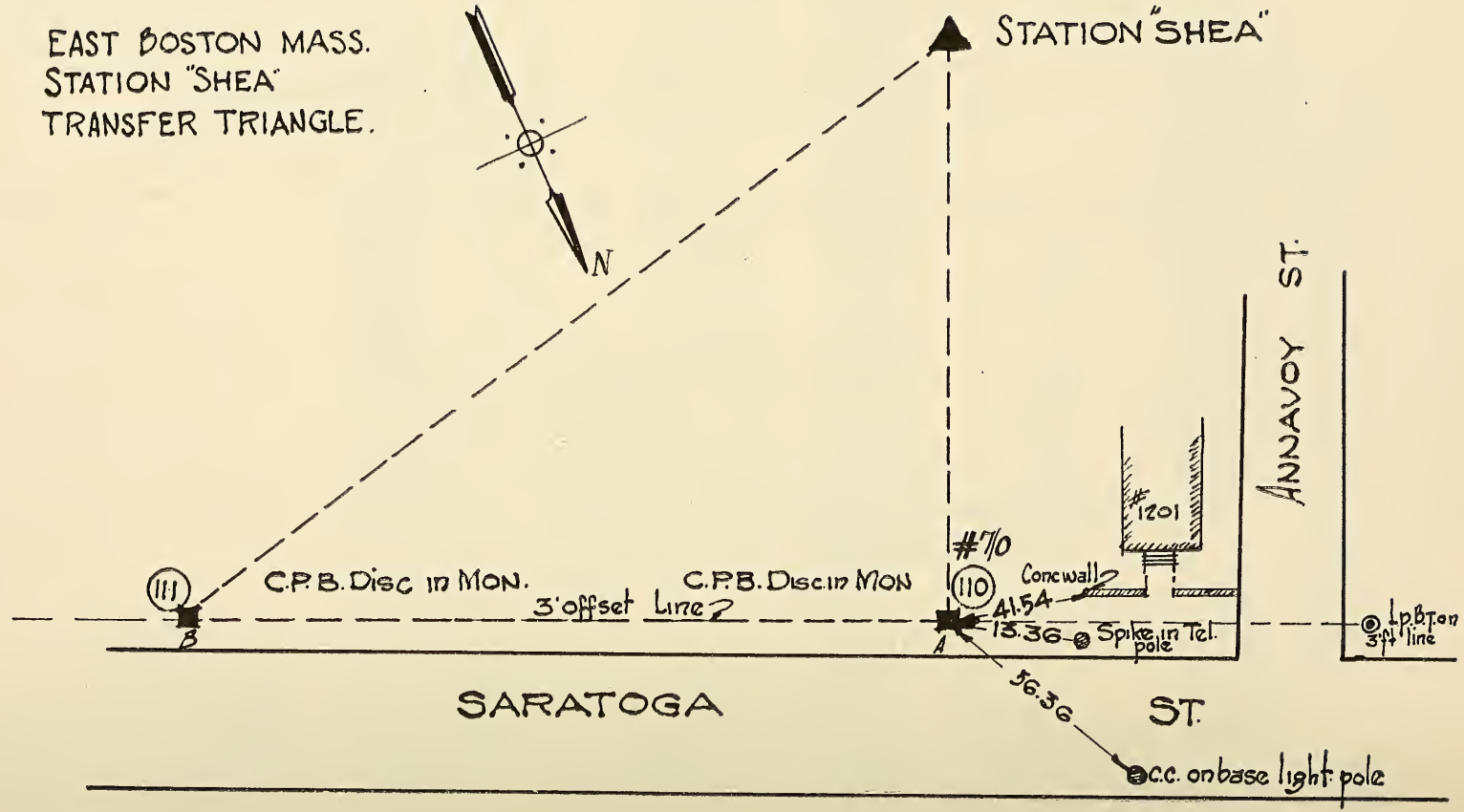
Description: This point consists of a C. P. B. disc set in a monument flush with the concrete sidewalk on the north side of Jersey Street, near the corner of Van Ness Street, located as follows:

Southeast 15.62′ from corner of rectangular post.
South 7.80′ from corner of 2nd rectangular post.
Southwest 3.70′ from corner of 3rd rectangular post.
West 6.70′ from corner of 4th rectangular post.

GROUND TRANSFER POINT, "SEARS" MONUMENT No. 108 — (First order traverse point No. F1/0).

Description: This point consists of a C. P. B. disc set in a monument flush with the concrete sidewalk near the southeast corner of Peterborough and Jersey Streets, located as follows:

West 6.38′ from c. c. on B. C. G. Co. drip.
West 8. 2′ from R. O. C. of bay on Jersey Street of No. 50 Peterborough Street.
Southwest 7.23′ from L. O. C. of bay on Jersey Street of No. 50 Peterborough Street.
South 11.73′ from L. O. C. of jog of No. 50 Peterborough Street.
South 13.79′ from R. O. C. of Main building of No. 50 Peterborough Street.


EAST BOSTON MASS.
STATION "SHEA"
TRANSFER TRIANGLE.
N
STATION "SHEA"
ANNAVOY ST.
#1201
#710
111
C.P.B. Disc in MON.
3' offset Line
C.P.B. Disc in MON
110
Concwall
41.54
13.36
Spike in Tel. pole
I.p.B.T. on 3-ft line
B
A
SARATOGA
ST.
56.36
c.c. on base light pole

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SHEA STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: EAST BOSTON

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.2 meters.
Height of telescope above station mark, 4.4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Bulk	2256.27	0 00 00	33 54 50.67
Ref. Mark No. 1	6.84	17 16 35	51 12 25.67
Ref. Mark No. 2	8.08	257 06 15	291 01 05.67
Note: Ref. Marks Nos. 1 and 2 are round cylinders of concrete with a top ½-inch rod set in the top of each.			

Detailed Description:

A punch hole in a ½-inch round iron rod set in a cylinder of concrete, flush with the ground, of the highest point of Shea's Hill in East Boston.

Located in an open field, near the edge of a bluff about 25 feet above the grade of Annavoy Street; 132 feet southwest from the center line of Annavoy Street; 312 feet south from the center line of Saratoga Street.

Described by JOHNSON Marked by.....

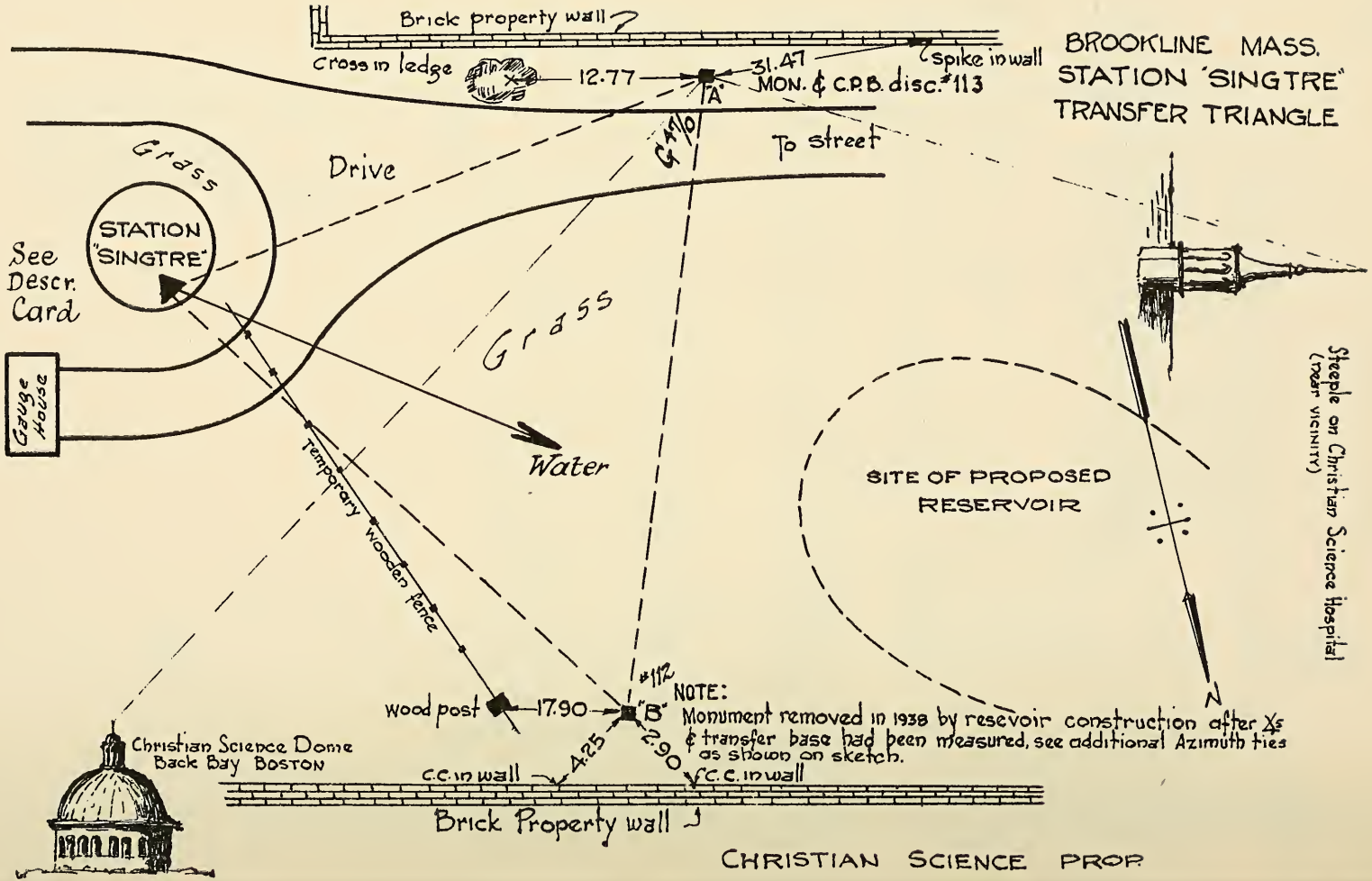
GROUND TRANSFER POINT "SHEA" MONUMENT No. 111.

Description: This monument is located on the 3-foot offset line on the south side of Saratoga Street, 290.00 feet east of monument No. 110.

GROUND TRANSFER POINT "SHEA" MONUMENT No. 110 — (First order traverse point No. 7/0).

Description: This point is located on the 3-foot offset line on Saratoga Street and consists of a C. P. B. disc set in a monument.

East 41.54′ from concrete wall of 1201 Saratoga Street.
Southeast 13.36′ from spike on telephone pole.
South 56.36′ from c. c. on base of light pole.


BROOKLINE MASS.
STATION "SINGTRE"
TRANSFER TRIANGLE
Brick property wall
Cross in ledge
12.77
31.47
Spike in wall
MON. & C.P.B. disc. #113
"A"
To street
Drive
Grass
STATION "SINGTRE"
See Descr. Card
Gauge House
Grass
Water
Temporary wooden fence
SITE OF PROPOSED RESERVOIR
Steeple on Christian Science Hospital (near vicinity)
#112
Wood post
17.90
"B"
NOTE:
Monument removed in 1938 by resevoir construction after Xs & transfer base had been measured, see additional Azimuth ties as shown on sketch.
Christian Science Dome
Back Bay Boston
C.C. in wall
4.25
2.90
C.C. in wall
Brick Property wall
CHRISTIAN SCIENCE PROP

(144)

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SINGTRE STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: DEMODENA YEAR: 1938 LOCALITY: BROOKLINE

Surface-station mark, Note, Od
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.99 meters.
Height of telescope above station mark, 2.28 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Water	2476.47		133 28 25.70
No Ref. Marks Ties only			

Detailed Description:

A brass tack set in tar covered tin roof which is on top of a water tank situated on Singletree Reservoir in Brookline. Situated approximately 0.6 of a mile easterly of the Worcester Turnpike, approximately 450 feet from southeasterly corner of the Christian Science Hospital.

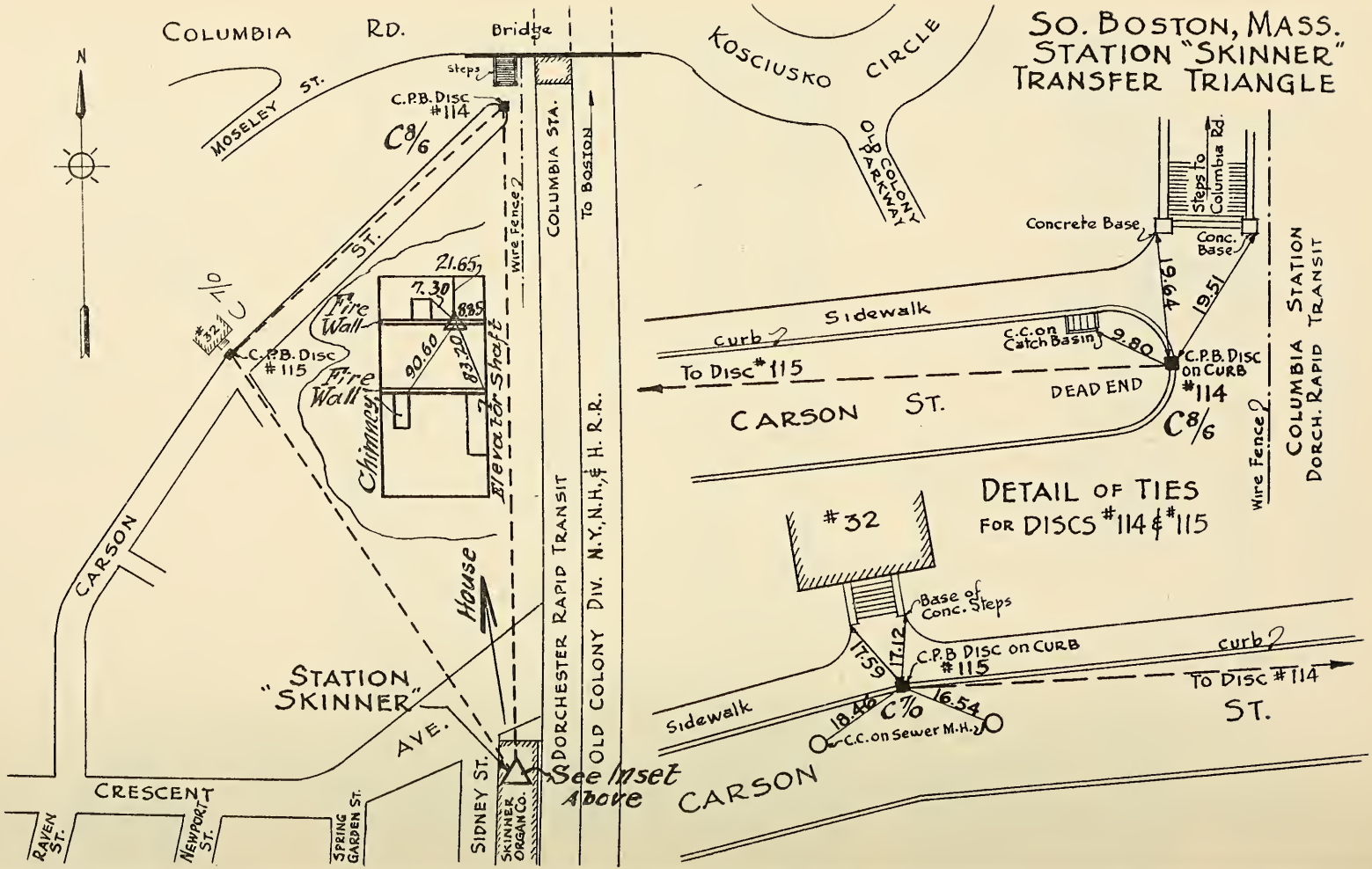
Station is reached by taking driveway from Worcester Turnpike leading to service entrance of Christian Science Sanatorium.

As the Brookline Water Department plans to remove this tank the position was transferred to the ground by means of a transfer triangle located in the nearby grounds and the position was held by taking azimuth ties to prominent marks at the end of the base.

Described by DEMODENA Marked by.....

GROUND TRANSFER POINT, "SINGTRE" MONUMENT No. 113 —(First order traverse. point No. G47/0).
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the south side of the drive leading into the grounds.
East 12.77′ from c. c. in ledge.
West 31.47′ from spike in brick property wall.

GROUND TRANSFER POINT, "SINGTRE" MONUMENT No. 112.
Description: This monument is located on the south side of the brick property wall on the north side of the grounds.
Southeast 2.90′ from c. c. on top of brick property wall.
Southwest 4.25′ from c. c. on top of brick property wall.
West 17.90′ from wood post of temporary fence.
NOTE: Monument removed in 1938 by reservoir construction after angles and transfer base had been measured, see additional azimuth ties as shown on sketch.


SO. BOSTON, MASS.
STATION "SKINNER"
TRANSFER TRIANGLE
COLUMBIA RD.
Bridge
Steps
KOSCIUSKO CIRCLE
O.B. PARKWAY
MOSELEY ST.
C.P.B. Disc #114
C8/6
N
COLUMBIA STA.
To BOSTON
Wire Fence
Concrete Base
Steps To Columbia Rd.
Conc. Base
19.94
19.51
Sidewalk
Curb
C.C. on Catch Basin
2.80
C.P.B. Disc on Curb #114
To Disc #115
CARSON ST.
DEAD END
C8/6
COLUMBIA STATION
DORCH. RAPID TRANSIT
DETAIL OF TIES
FOR DISCS #114 & #115
#32
Base of Conc. Steps
17.12
17.59
C.P.B. Disc on Curb #115
Curb
To Disc #114
Sidewalk
18.46
C1/0
16.54
C.C. on Sewer M.H.
ST.
CARSON
#32
C1/0
21.65
7.30
8.35
Fire Wall
90.60
83.20
Fire Wall
Chimney
Elevator Shaft
C.P.B. Disc #115
CARSON
House
STATION "SKINNER"
AVE.
CRESCENT
RAVEN ST.
NEWPORT ST.
SPRING GARDEN ST.
SIDNEY ST.
SKINNER ORGAN CO.
See Inset Above
DORCHESTER RAPID TRANSIT
OLD COLONY DIV. N.Y.N.H. & H. R.R.

(SH1)

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SKINNER STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.055 meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
House	960.53		177 26 51.61
No Ref. Marks			
Ties only			

Detailed Description:

A standard C. P. B. disc station mark set in top of brick fire wall on the northeastern corner of the Æolian Skinner Organ Company Factory, No. 215 Sydney Street near Crescent Avenue in Dorchester.

Located 8.85 feet west along brick fire wall from east wall of factory; 90.60 feet north from northeastern corner of brick chimney; 83.20 feet northwest from northeastern corner of brick elevator shaft house.

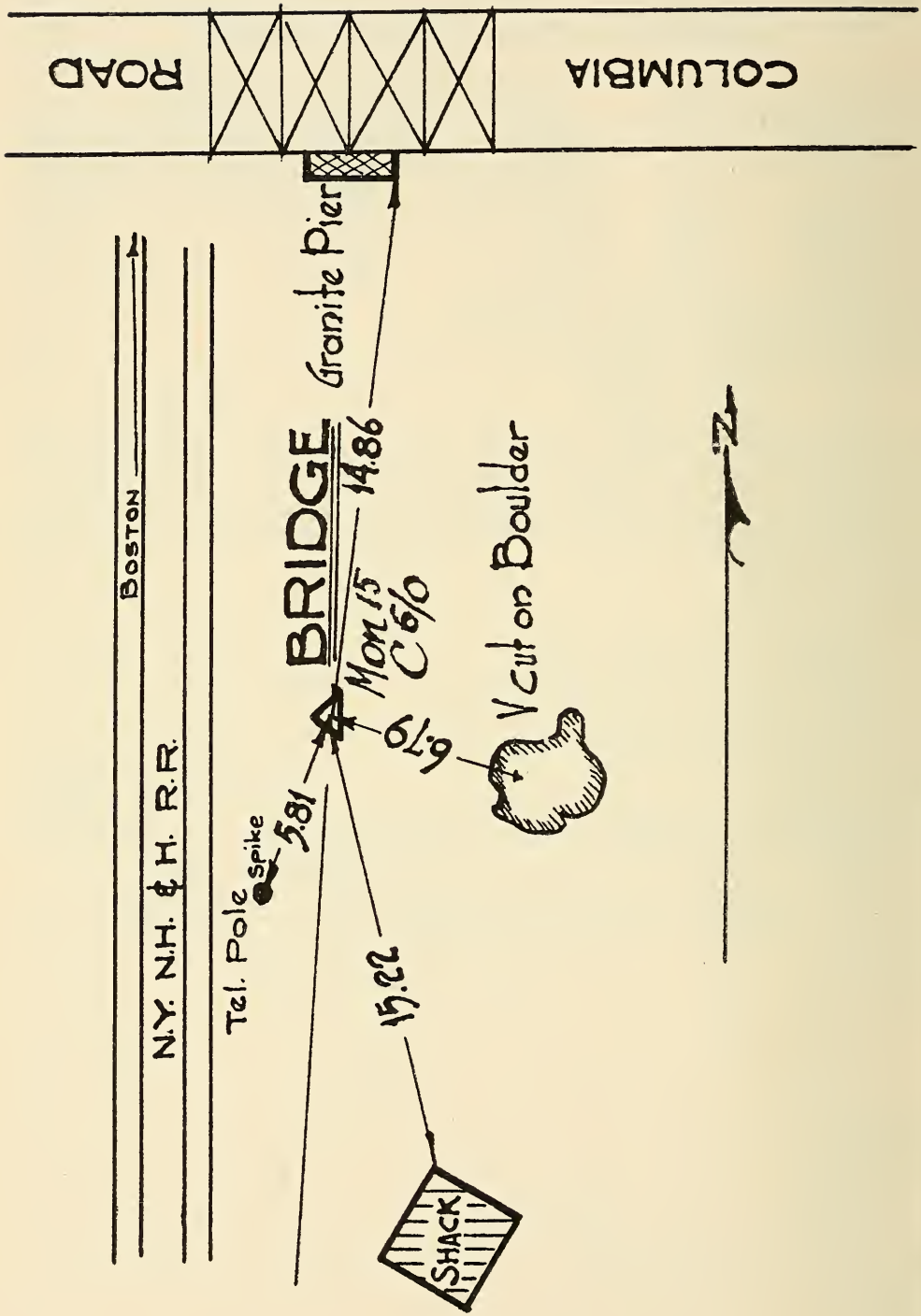
Described by JOHNSON Marked by.....

GROUND TRANSFER POINT, "SKINNER" C. P. B. DISC IN CURB No. 115—(First order traverse point No. C7/0).

Description: This is a C. P. B. disc located in the curb in front of No. 32 Carson Street.
North 18.46′ from c. c. on sewer M. H.
East 17.59′ from southwest side of concrete steps at No. 32.
Southeast 17.12′ from northeast side of concrete steps at No. 32.
West 16.54′ from c. c. on sewer M. H.

GROUND TRANSFER POINT, "SKINNER" C. P. B. DISC IN CURB No. 114—(First order traverse point No. C8/6).

Description: This point is a C. P. B. disc located in the curb in the middle of dead end at Carson Street.
South 19.51′ from east concrete base of stairway leading to Columbia Road.
Southeast 19.64′ from west concrete base of stairway leading to Columbia Road.
East 9.80′ from c. c. on catch-basin near P. C. of dead end of Carson Street.


COLUMBIA
ROAD
Granite Pier
BRIDGE
14.86
Mon 15
C 6/0
V Cut on Boulder
6.19
5.81
spike
Tel. Pole
15.22
SHACK
N.Y. N.H. & H. R.R.
BOSTON

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: * BRIDGE STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: ADELMAN YEAR: 1937 LOCALITY: SOUTH BOSTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Skinner			03 25 59
No Ref. Marks Ties only			

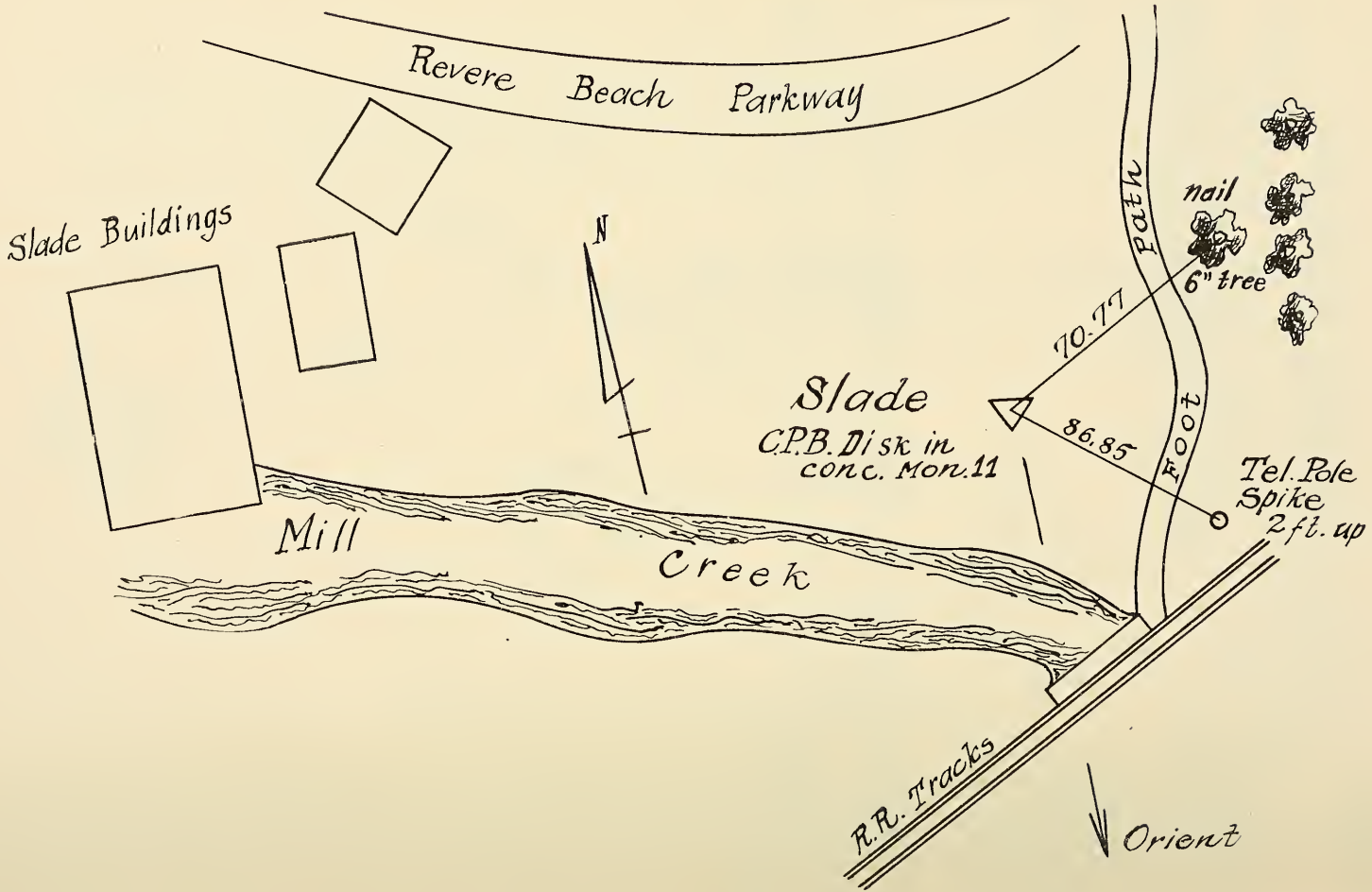
Detailed Description:

* Bridge is on the westerly end of the Mile Road base occupied from the ground.

A bronze C. P. B. disc set in a concrete monument, the top of which is one inch above the ground.

Located about 15 feet south of center pier of Columbia Road Bridge, about 8 feet east of N. Y., N. H. & H. R. R., about 15 feet north of a metal shack and on the westerly side of Mount Vernon Street bend.

Described by ADELMAN Marked by ADELMAN


Revere Beach Parkway
Slade Buildings
N
Path
nail
6" tree
70.77
Slade
C.P.B. Disk in conc. Mon. 11
86.85
Foot
Tel. Pole
Spike
2 ft. up
Mill
Creek
R.R. Tracks
Orient

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SLADE STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: JOHNSON YEAR: 1937 LOCALITY: REVERE

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, 11a
Reference mark, Note, 11a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.12 meters.
Height of telescope above station mark, 4.4 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

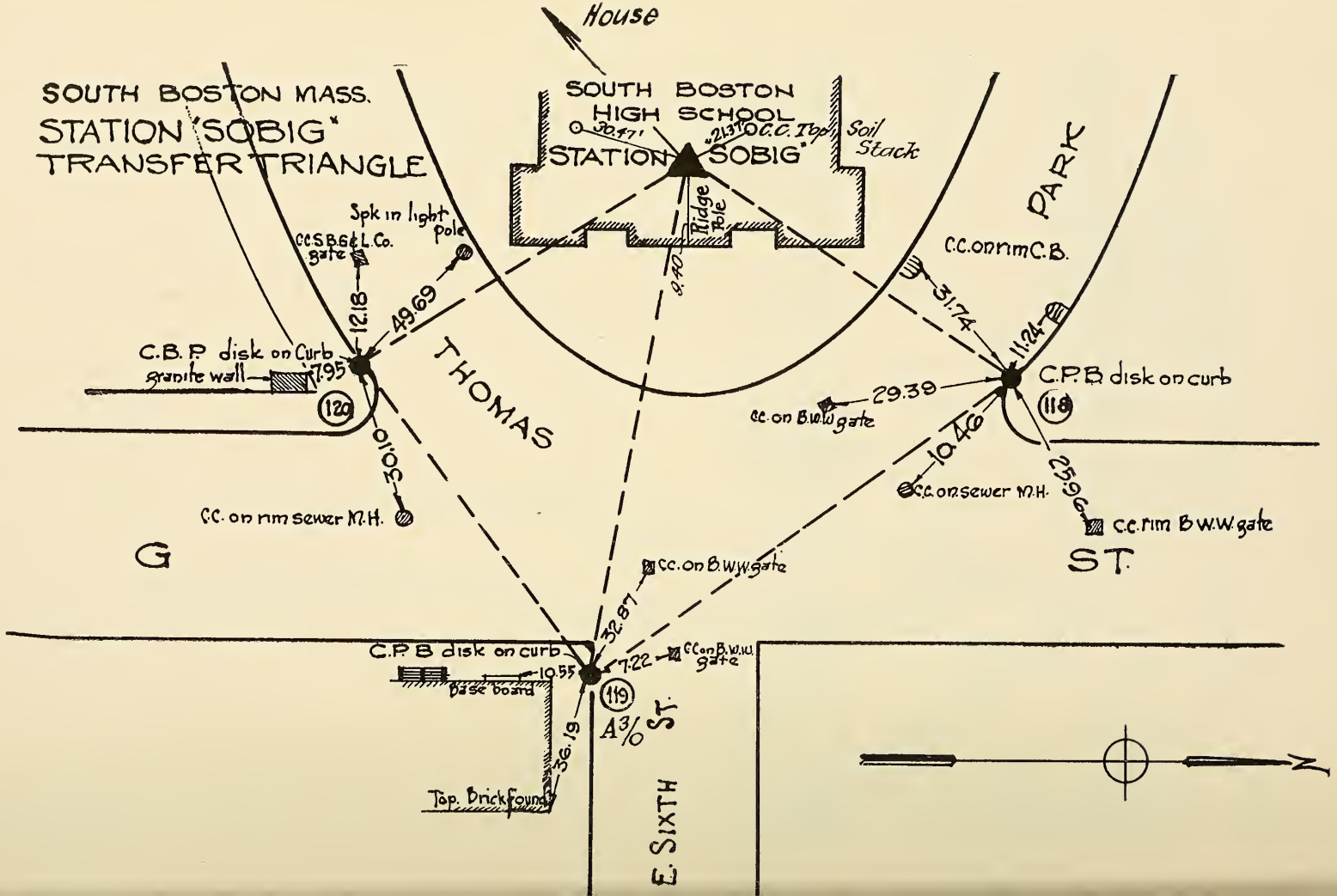
Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Orient	1223.17	0 00 00	2 02 43.86
Ref. Mark No. 1	13.83	231 21 13	233 23 56.86
Ref. Mark No. 2	13.66	315 35 00	317 37 43.86

Detailed Description:

A bronze C. P. B. disc set in a concrete monument, the top of which is flush with the ground. Located in an open field about 200 feet north of Mill Creek, about 1,000 feet northeast of the Slade Mill, about 95 feet northwest of R. R. tracks.

Station occupied with a 13-foot tower. This is the southeasterly end of the Revere base.

Described by JOHNSON Marked by.....


House
SOUTH BOSTON MASS.
STATION "SOBIG"
TRANSFER TRIANGLE
SOUTH BOSTON
HIGH SCHOOL
30.47'
21.3' O.C. Top
Soil Stack
STATION "SOBIG"
Ridge Pole
9.40
PARK
C.C. on rim C.B.
Spk in light Pole
C.C. S.B.G.&L.Co. gate
12.18
49.69
31.74
11.24
C.B.P. disk on Curb
granite wall
7.95
120
THOMAS
C.P.B. disk on curb
118
29.39
C.C. on B.W.W. gate
10.46
30.10
C.C. on rim sewer M.H.
C.C. on sewer M.H.
25.96
C.C. rim B.W.W. gate
G
ST.
C.C. on B.W.W. gate
32.87
C.P.B. disk on curb
7.22
C.C. on B.W.W. gate
10.55
Base board
119
A 3/0 ST.
36.19
Top. Brick found
E. SIXTH
N

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SOBIG STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: JOHNSON YEAR: 1937 LOCALITY: SOUTH BOSTON

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.76 meters.
Height of telescope above station mark, 2.05 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
House No Ref. Marks Ties only	894.93		50 10 55.85

Detailed Description:

A punch hole in the copper on the ridge pole at the eastern end of the roof of the South Boston High School.

Located 9.40 feet northwest along the ridge pole from the outside edge of the copper roof; 18.47 feet southwest from the southwestern corner of top of cap on chimney (slant distance); 21.35 feet south from the southeastern corner of top of cap on small chimney (slant distance); 30.47 feet east from cross-cut on top of soil stack near ventilator (slant distance).

Described by JOHNSON Marked by.....

GROUND TRANSFER POINT, "SOBIG" C. P. B. DISC. No. 118.

Description: This point is a C. P. B. disc set in the curb at the intersection of "G" Street and Thomas Park.

Northeast 31.74′ from c. c. rim of C. B.
Southeast 11.24′ from c. c. rim of C. B.
Southwest 25.96′ from c. c. rim of B. W. gate.
Northwest 10.46′ from c. c. on sewer M. H.
North 29.39′ from c. c. on B. W. W. gate.

GROUND TRANSFER POINT, "SOBIG" C. P. B. DISC No. 119 — (First order traverse point No. A3/0).

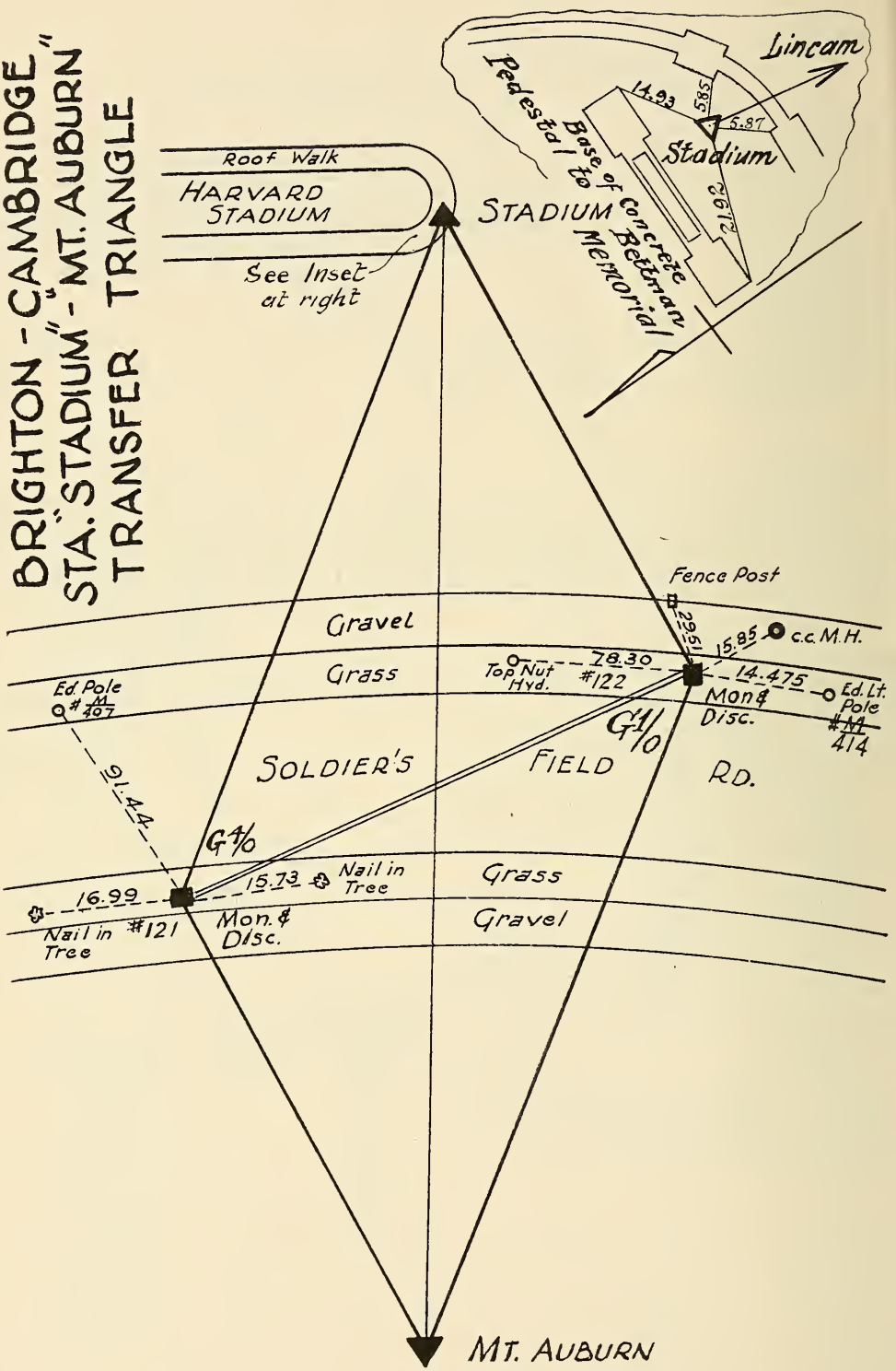
Description: This point is a C. P. B. disc set in the curb at the intersection of East Sixth and "G" Streets.

South 7.22′ from c. c. on B. W. W. gate.
Northwest 36.19′ from top brick foundation.
North 10.55′ from corner base board.
Southeast 32.87′ from c. c. on B. W. W. gate.

GROUND TRANSFER POINT, "SOBIG" C. P. B. DISC No. 120.

Description: This is a C. P. B. disc set in the curb at the corner of "G" Street and Thomas Park.

West 30.10′ from c. c. on rim sewer M. H.
North 7.95′ from corner granite wall.
East 12.18′ from c. c. B. G. & L. Co. gate.
Southeast 49.69′ from spike in L. P.


BRIGHTON - CAMBRIDGE, STA. "STADIUM" - MT. AUBURN TRANSFER TRIANGLE
Roof Walk
HARVARD STADIUM
See Inset at right
STADIUM
Lincam
Pedestal to Base of Concrete Bellman Memorial
14.93
585
5.87
Stadium
267.2
Fence Post
29.51
15.85
c.c. M.H.
Gravel
Grass
78.30
Top Nut Hyd. #122
14.475
Ed. Lt. Pole #M 414
Mon & Disc.
Ed. Pole #M 407
21.44
SOLDIER'S FIELD RD.
G 1/0
G 1/0
16.99
15.73
Nail in Tree
Grass
Nail in #121 Tree
Mon. & Disc.
Gravel
MT. AUBURN

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: STADIUM STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: BRIGHTON

Surface-station mark, Note, See below
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Lincam	1159.16		16 36 00.08
No Ref. Marks Ties only			

Detailed Description:

A bronze City Planning Board disc, set in concrete, flush with the top deck of the Harvard Stadium. It is located in the southerly end of the horseshoe, just to the east of the center line of the horseshoe. The Station is reached from the Western Avenue entrance, via the Press Box and then around the top deck to the southerly end.

The view is good from northwest through south to west.

Described by BULLMAN Marked by .....

GROUND TRANSFER POINT, "STADIUM" MONUMENT No. 121 — (First order traverse point No. G4/0).

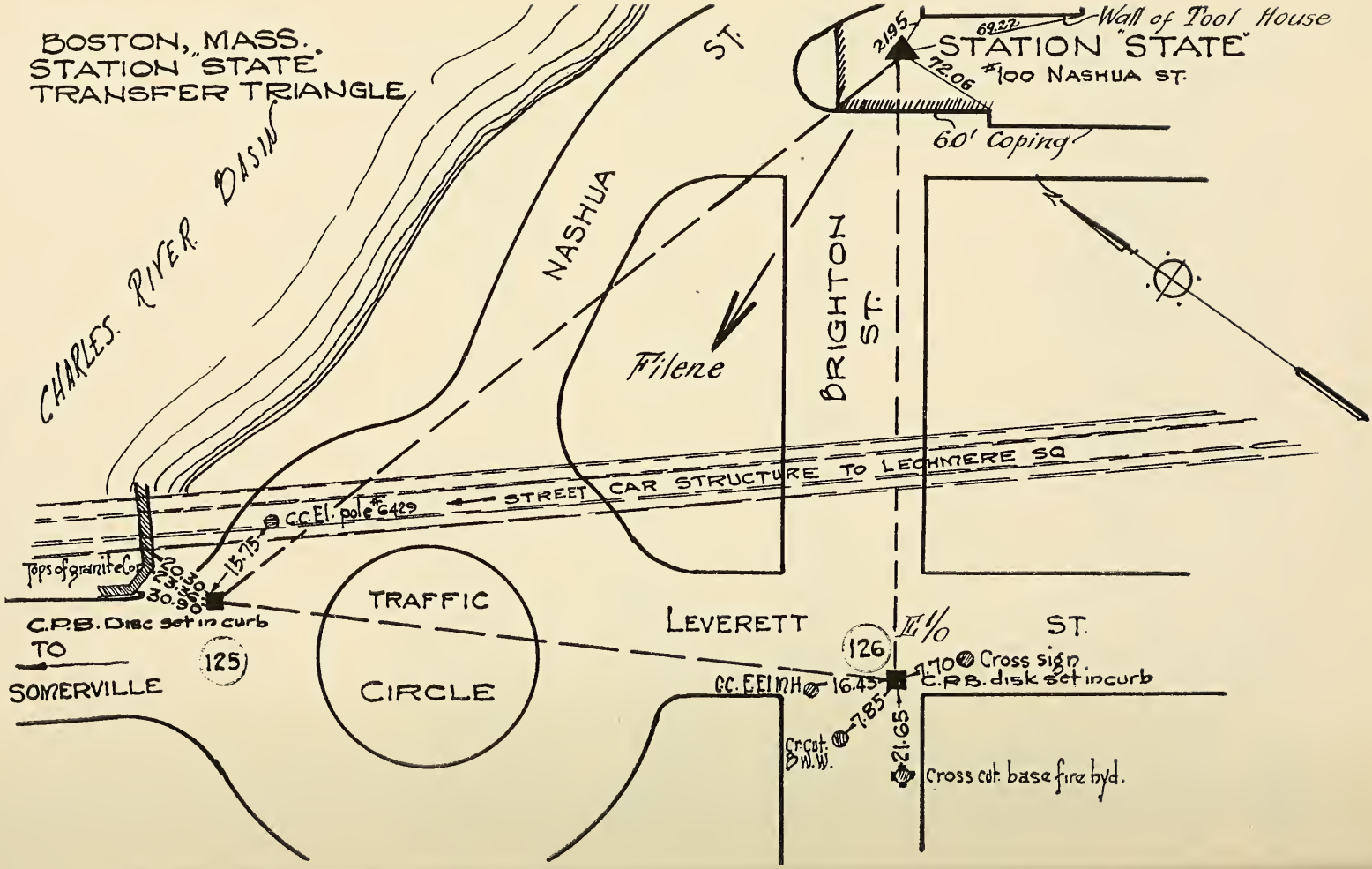
Description: This point is a C. P. B. disc in a concrete monument flush with the ground in the grass reservation on the northwest side of Soldiers Field Road.

North 15.73′ from nail in 6″ tree.
South 16.99′ from nail in 6″ tree.
West 91.44′ from E. E. I. light pole.

GROUND TRANSFER POINT, "STADIUM" MONUMENT No. 122 — (First order traverse point No. G1/0).

Description: This point is a C. P. B. disc in a concrete monument flush with the ground in the grass reservation on the southeast side of Soldiers Field Road.

North 15.85′ from c. c. on M. H.
West 29.51′ from corner of fence post.
Northeast 14.475′ from E. E. I. light pole No. M/414.


BOSTON, MASS.
STATION "STATE"
TRANSFER TRIANGLE
CHARLES RIVER BASIN
NASHUA ST.
Filene
BRIGHTON ST.
Wall of Tool House
STATION "STATE"
#100 NASHUA ST.
21.95
69.22
72.06
6.0' Coping
STREET CAR STRUCTURE TO LECHMERE SQ
C.C.El. pole #429
15.75
Tops of granite Co
30.90
30.90
C.R.B. Disc set in curb
TO
SOMERVILLE
125
TRAFFIC
CIRCLE
LEVERETT
E 1/0
ST.
126
7.70
Cross sign
C.R.B. disk set in curb
CC. EE in MH
16.45
7.85
21.65
Cr cut. B.W.W.
Cross cut base fire hyd.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: STATE
CHIEF OF PARTY: DEARBORN

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: BOSTON

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note, None
Witness mark, Note, None
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Filene	1387.06		64 46 53.99
No Ref. marks			
Ties only			

Detailed Description:

A C. P. B. disc set in concret pimple 4 inches above a tar and gravel roof of the Department of Public Works Building, 100 Nashua Street, Boston, Mass. Station mark is located on the northwesterly corner of the main roof at the 9th floor of the building. Visibility is limited to the north, south and west quadrants, the view to the east being blocked by the high penthouses on the building. Special privileges were allowed the Boston City Planning Board in occupying the station.

Described by T. HOMKOWICZ Marked by.....

GROUND TRANSFER POINT, "STATE" C. P. B. DISC No. 126 — (First order traverse point El/0).

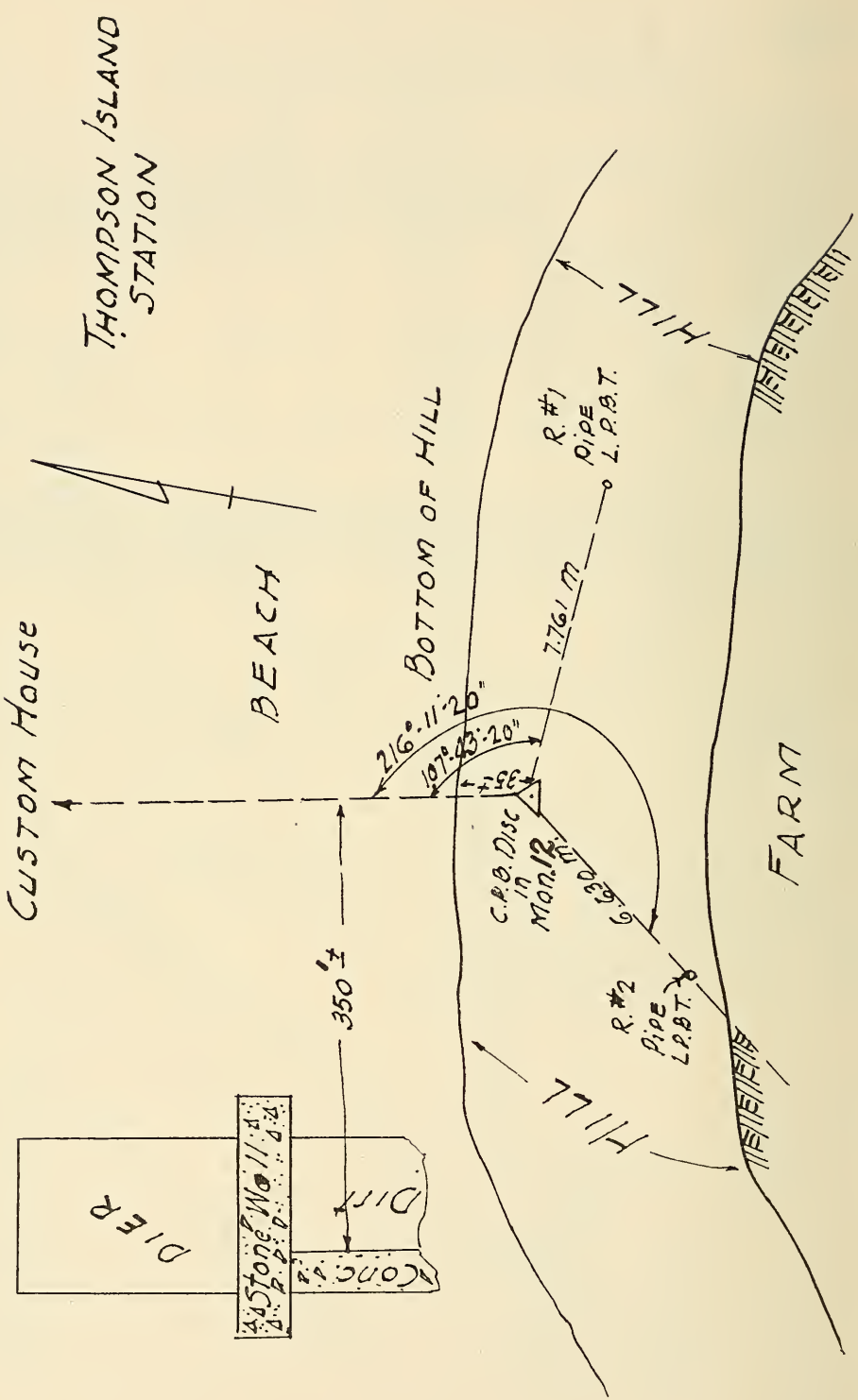
Description: This point is a C. P. B. disc in curb at the southeast corner of Brighton and Leverett Streets.

Southeast 16.45′ from c. c. E. E. I. Co. M. H.
West 7.70′ from c. c. sign.
Northeast 21.65′ from c. c. base of fire hydrant.
West 7.85′ from c. c. B. W. W.

GROUND TRAVERSE POINT, "STATE" C. P. B. DISC No. 125.

Description: This point is a C. P. B. disc set in curb at intersection of Nashua and Leverett Streets, northwest of traffic circle.

South 30.90′ from top of granite corner.
South 23.36′ from top of granite corner.
South 20.30′ from top of granite corner.
West 15.75′ from c. c. on El. Pole No. 6429.


THOMPSON ISLAND STATION
CUSTOM HOUSE
BEACH
BOTTOM OF HILL
R. #1 PIPE L.P.B.T.
7.76 M
216°-11'-20"
107°-43'-20"
35'±
C.P.B. DISC IN MON. 12
6.30
R. #2 PIPE L.P.B.T.
350'±
FARM
HILL
HILL
STONE WALL
CONC.
DIR
810

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: THOMPSON
CHIEF OF PARTY: H. ADELMAN

STATE: MASSACHUSETTS COUNTY: SUFFOLK
YEAR: 1938 LOCALITY: BOSTON HARBOR

Surface-station mark, Note, 1a
Underground-station mark, Note
Reference mark, R. M., No. 1 Note
Reference mark, R. M., No. 2 Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.5 meters.
Height of telescope above station mark, 1.78 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Custom House Tower	Meters	00 00 00	
R. M. No. 1	7.761	107 43 20	
R. M. No. 2	6.630	216 11 20	
Mile	2530.35		82 45 51.15

Detailed Description:

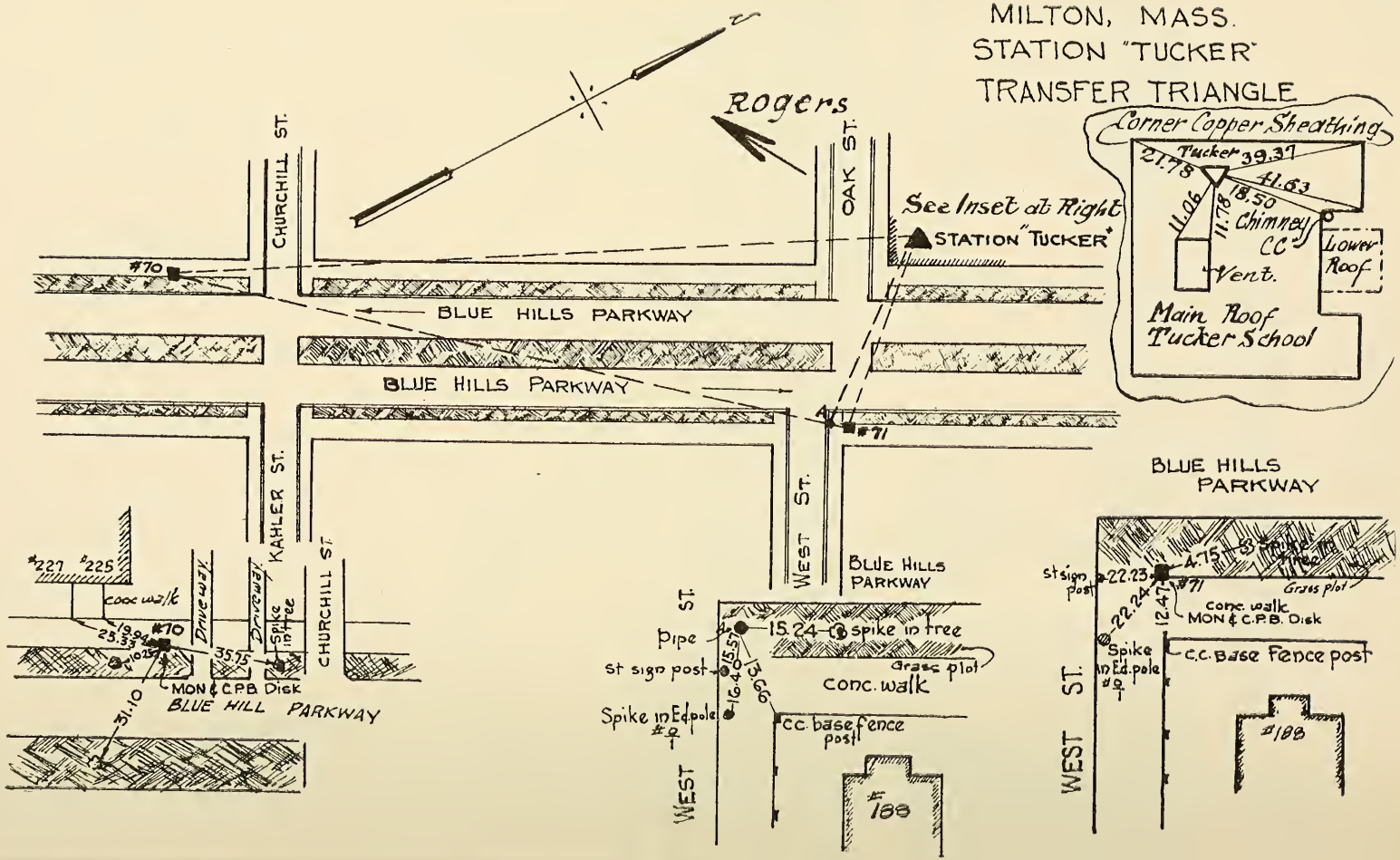
A C. P. B. disc set in concrete monument about 6 inches above ground, situated on the incline of the hill of the northerly side of Thompson Island (side of landing pier) about 350 feet from east end of concrete walk to pier and about 35 feet from bottom toward top of hill (toward south).

Ref. No. 1 is a pipe (LPBT) about 1 inch above ground, 7.761M east of monument, 107–43–20 clockwise from Custom House (point of tower).

Ref. No. 2 is a pipe (LPBT) about 1 inch above ground, 6.630 meters southwest of monument, 216–11–20 clockwise from Custom House (point of tower).

Visibility is good in all but the southerly quadrants where the view is blocked by the adjacent hill and buildings on the island.

Described by L. DEMODENA Marked by.....


MILTON, MASS.
STATION "TUCKER"
TRANSFER TRIANGLE
Rogers
CHURCHILL ST.
OAK ST.
See Inset at Right
STATION "TUCKER"
#70
BLUE HILLS PARKWAY
BLUE HILLS PARKWAY
#71
KAHLER ST.
CHURCHILL ST.
WEST ST.
Corner Copper Sheathing
Tucker
21.78
39.37
41.63
18.50
11.06
11.78
Chimney
CC
Vent.
Lower Roof
Main Roof
Tucker School
#227
#225
conc walk
Driveway
Spike in Tree
19.94
25.33
10.25
35.15
31.10
MON & C.P.B. Disk
BLUE HILL PARKWAY
BLUE HILLS PARKWAY
pipe
15.24
spike in tree
grass plot
st sign post
16.45
13.66
conc. walk
Spike in Ed. pole #9
c.c. base fence post
#188
WEST ST.
BLUE HILLS PARKWAY
st sign post
22.23
4.75
Tree
Grass plot
#71
conc. walk
MON & C.P.B. Disk
22.24
12.47
Spike in Ed. pole #9
c.c. Base Fence post
#188
WEST ST.

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: TUCKER STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: MILTON

Surface-station mark, Note, 1a
Underground-station mark, Note, None
Reference mark, Note, None
Reference mark, Note, None
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 2.118 meters.
Height of telescope above station mark, 2.41 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Rogers	2266.17		83 10 27.12
No Ref. Marks Ties only			

Detailed Description:

A standard C. P. B. disc set in concrete pimple 4 inches above a tar and gravel roof of the Tucker School, located at the corner of Oak Street and the Blue Hills Parkway in Milton, Mass.

Visibility is limited to a two-mile horizon because of neighboring hills and trees.

Station is best reached by taking Blue Hills Parkway from Mattapan Square to school.

Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT, "TUCKER" MONUMENT No. 71.

Description: This point is a C. P. B. disc set in a concrete monument flush with the gravel walk on the southeast side of the Blue Hills Parkway at the corner of West Street.

Northwest 12.47′ from c. c. base of fence post.
North 22.24′ from spike in Ed. pole No. 0/1.
Northeast 22.23′ from street sign post.
South 4.75′ from spike in tree.

GROUND TRANSFER POINT, "TUCKER" PIPE POINT "A."

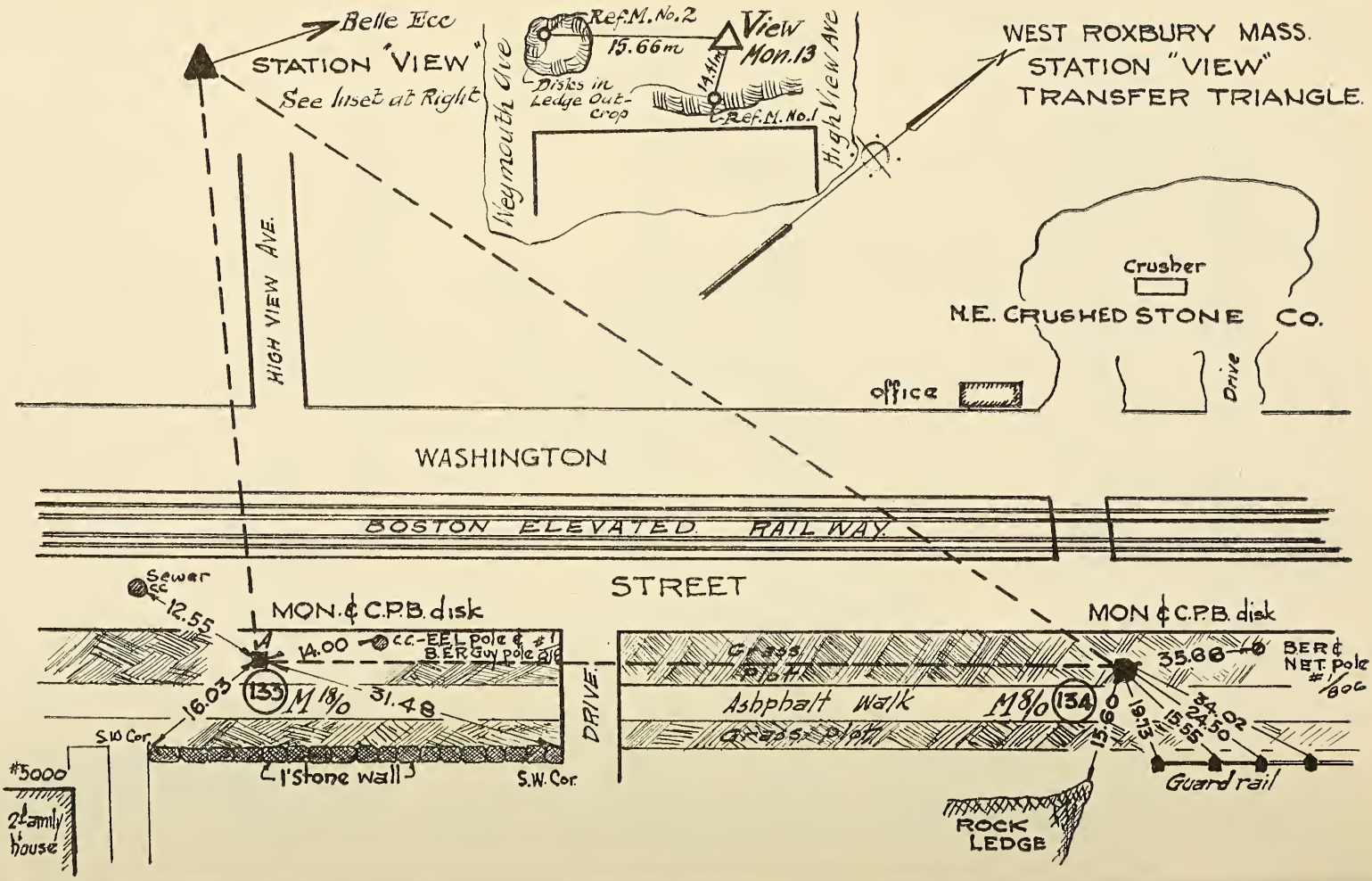
Description: This point is a pipe driven in the ground in the grass plot near monument No. 71.

South 15.24′ from spike in tree.
West 13.66′ from c. c. base fence post.
Northwest 16.40′ from spike in Ed. pole No. 0/1.
North 15.57′ from street sign post.

GROUND TRANSFER POINT, "TUCKER" MONUMENT No. 70.

Description: This point is a C. P. B. disc set in a concrete monument flush with the gravel walk located on the northwest side of the Blue Hills Parkway near Churchill Street.

Northwest 31.10′ from spike in tree.
North 10.95′ from spike in tree.
East 25.33′ from left corner of concrete walk to No. 227.
East 19.94′ from right corner of concrete walk to No. 227.
Southwest 35.75′ from spike in tree.


Belle Ecc
STATION "VIEW"
See Inset at Right
Ref.M. No.2
15.66m
View
Mon.13
Disks in Ledge Outcrop
Ref.M. No.1
Weymouth Ave
High View Ave
WEST ROXBURY MASS.
STATION "VIEW"
TRANSFER TRIANGLE.
HIGH VIEW AVE.
Crusher
N.E. CRUSHED STONE CO.
office
Drive
WASHINGTON
BOSTON ELEVATED RAIL WAY
STREET
Sewer cc
12.55
MON. ¢ C.P.B. disk
14.00
cc-EEL pole ¢ #1
BER Guy pole #2
16.03
133
M 18/0
31.48
S.W. Cor
1'stone wall
S.W. Cor
#5000
2 family house
DRIVE
Gr. 335 plot
Ashphalt Walk
Grass plot
M 8/0
134
MON ¢ C.P.B. disk
35.88
BER ¢ NET pole #1/806
34.02
24.50
19.73
15.55
15.6
0
Guard rail
ROCK LEDGE

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: VIEW STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: WEST ROXBURY

Surface-station mark, Note 1a
Underground-station mark, Note, 7c
Reference mark, No. 1, Note, 12a
Reference mark, No. 2, Note, 12a
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 6.30 meters.
Height of telescope above station mark, 6.59 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Belle Ecc.	Meters	00 00 00	221 20 44
Ref. Mark No. 1	14.41	88 07 23	309 28 07
Ref. Mark No. 2	15.66	174 33 53	35 54 37
Kilmer	919.91		119 26 43.08

Detailed Description:

A C. P. B. disc set in concrete monument on the quarry property of Ayoub Maloof, situated in West Roxbury, Massachusetts. Station mark is located on the high point of land approximately 100 feet west of the termination of High View avenue and is best reached by taking said avenue from Washington Street to the path at its end leading to station.

Visibility is good from the northwest to the south but is somewhat limited in the northerly to easterly directions due to neighboring hills.

Ref. Mark No. 1 is a standard C. P. B. disc in ledge outcrop 14.41 meters southeast of station.

Ref. Mark No. 2 is a standard C. P. B. disc in ledge outcrop 15.66 meters southwest of station.

Described by J. M. DEARBORN Marked by.....

GROUND TRANSFER POINT "VIEW" MONUMENT No. 133 — (First order traverse point No. M18/0).

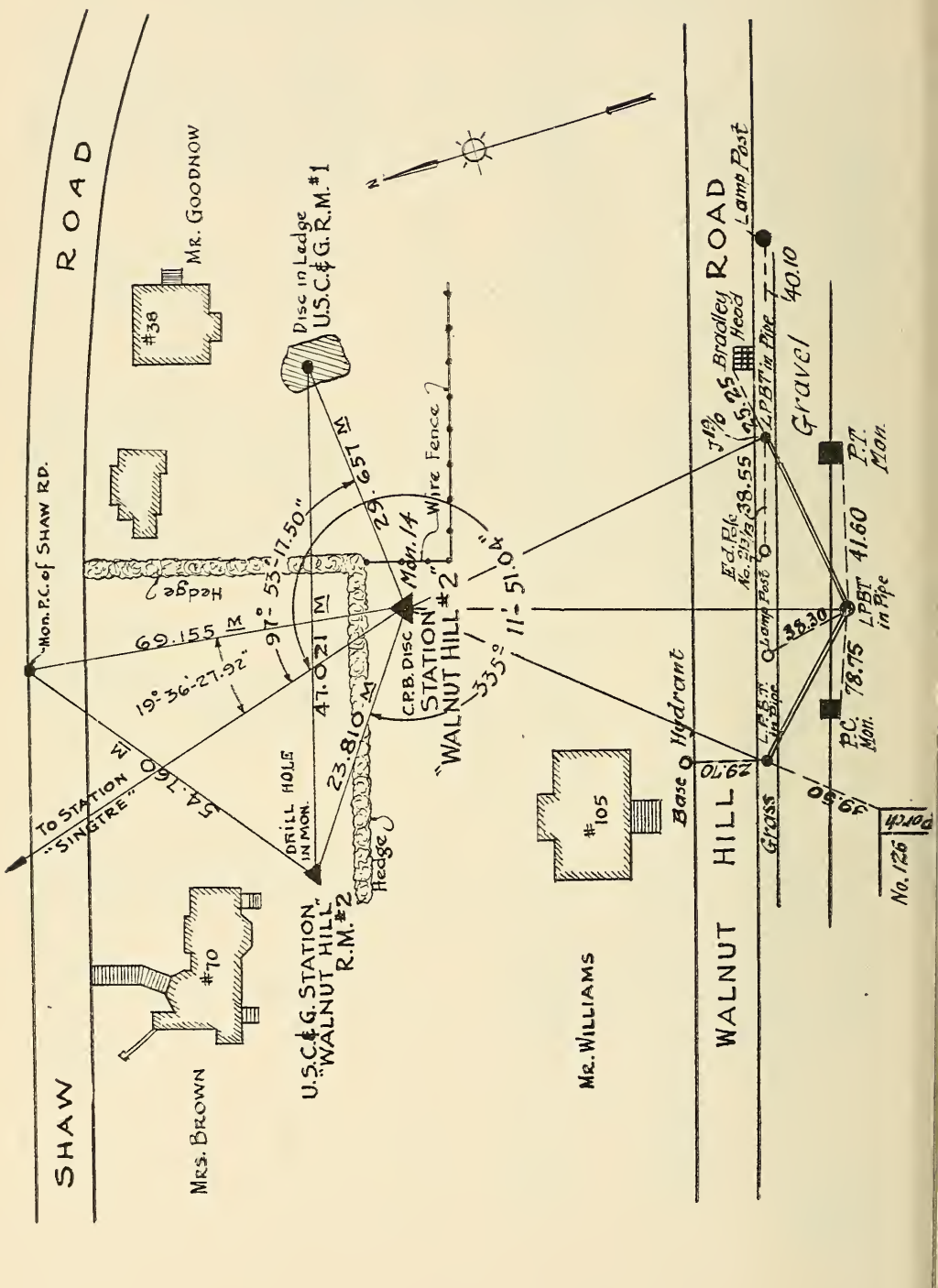
Description: This point is a C. P. B. disc set in a concrete monument flush with the ground on the southeasterly side of Washington Street directly opposite the intersection of High View Avenue and on the approximate 8-foot line of Washington Street.

East 12.55′ from c. c. on sewer.
Southwest 14.00′ from E. E. L. & B. E. R. pole No. 1/818.
West 31.48′ from corner of drive and 1 foot stone wall.
North 16.03′ from corner of stone wall.

GROUND TRANSFER POINT "VIEW" MONUMENT No. 134 — (First order traverse point No. M8/0).

Description: This point is a C. P. B. disc set in a concrete monument flush with the ground located on the southeasterly side of Washington Street about 800 feet northeast of High View Avenue.

Southwest 35.68′ from B. E. R. & N. E. Tel. pole No. 1/806.
West 34.02′ from post in guard rail.
West 24.50′ from post in guard rail.
West 15.55′ from post in guard rail.
Northwest 19.73′ from post in guard rail.
Northwest 15.60′ from c. c. in ledge.


SHAW ROAD
WALNUT HILL ROAD
MR. WILLIAMS
MRS. BROWN
#70
#105
#38
MR. GOODNOW
Mon. P.C. of SHAW RD.
Hedge
Disc in Ledge
U.S.C.&G.R.M.#1
Wire Fence
Mon. 14
C.P.B. DISC
STATION "WALNUT HILL #2"
U.S.C.&G. STATION "WALNUT HILL" R.M.#2
DRILL HOLE IN MON.
TO STATION "SINGTRE"
69.155 M
19° 36' 27.92"
97° 53' 17.50"
47.021 M
23.810 M
29.651 M
54.760 M
11° 51' 04"
335°
Base
Hydrant
Ed. Pole No. 2134
38.55
Lamp Post
38.30
L.P.B.T. in Pipe
41.60
P.C. Mon.
78.75
P.T. Mon.
40.10
Gravel
7.1%
25.25
Bradley Head
Lamp Post
L.P.B.T. in Pipe
Gross
01.62
03.50
No. 126
Porch

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WALNUT HILL No. 2 STATE: MASSACHUSETTS COUNTY: NORFOLK
CHIEF OF PARTY: THEODORE HOMKOWICZ YEAR: 1938 LOCALITY: BROOKLINE

Surface-station mark, Note, 1a
Underground-station mark, Note, 7c
Reference mark, No. 1 Note, 12a*
Reference mark, No. 2 Note, 11a**
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 12.21 meters.
Height of telescope above station mark, 12.50 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Singtree	2215.90	0 00 00	188 48 54.88
P. C. Shaw Rd.	69.155	19 36 28	208 25 22.88
Ref. Mark No. 1	29.657	97 53 18	286 42 12.88
Walnut Hill	23.810	335 11 51	164 00 45.88

*Ref. No. 1 is U. S. C. and G. Ref. No. 1 f or Walnut Hill
**Ref. No. 2 is Stati on Walnut Hill.

Detailed Description:

A C. P. B. disc in a concrete monument 14 inches square, the top of which is one foot above the ground.

Situated in the northeastern corner of the property belonging to Mr. Williams at No. 105 Walnut Hill Road. Located 69.155 meters south of the P. C. of Shaw Road, about 30 meters southwest of house No. 38 Shaw Road, about 25 meters southeast of No. 70 Shaw Road.

Position occupied with a forty foot tower and visibility is good in all directions.

Described by T. HOMKOWICZ Marked by.....

GROUND TRANSFER POINT, "WALNUT HILL 2" L. P. B. T.—(First order traverse point No. J 19/0).

Description: This point is a one and one-half-inch iron pipe with L. P. B. T. flush with ground located on westerly side of Walnut Hill Road, opposite No. 85 — Located as follows:

Southeast 38.55′ from tack in E. E. I. pole 213/13.
West 25.25′ from Bradley Head.
Northwest 40.10′ from c. c. in lamp post.

GROUND TRANSFER POINT, "WALNUT HILL 2" PT. "B" L. P. B. T.

Description: This point is an L. P. B. T. in a pipe located on the westerly side of Walnut Hill Road. It is flush with the ground.

Southeast 78.75′ from P. C. monument.
South 38.30′ from lamp post.
West 41.60′ from P. T. monument.

GROUND TRANSFER POINT, "WALNUT HILL 2". L. P. B. T. PT. "C".

Description: This point is a L. P. B. T. in a pipe set flush with the ground, on the westerly side of Walnut Hill Road.

South 29.70′ from base of Hydrant.
Northeast 39.50′ from corner of porch at No. 126 Walnut Hill Road.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WATER
STATE: MASSACHUSETTS COUNTY: MIDDLESEX
ESTABLISHED BY: K. T. ADAMS
YEAR: 1933 LOCALITY: NEWTON
RECOVERED BY:* DEARBORN
YEAR: 1938

Detailed statement as to the fitness of the original description:

Station WATER is a first order Coast and Geodetic Survey station in the extreme eastern section of the City of Newton. It is on the top of a very large dirt covered reservoir on the summit of Waban Hill. Two paths running about north and south, and east and west, across the top of the reservoir intersect at about the center of the reservoir. At the intersection of the paths there is a circular cover 45½ feet in diameter, raised about 1 foot above the surface of the paths.

The station mark is a standard disc station marker set in the center of the top of a concrete monument 12 inches in diameter, 18 inches in diameter at the bottom and 42 inches long. It is imbedded in about the center of the path running easterly from the center of the reservoir, 34.5 feet from the center of the raised cover, 11.25 feet from the nearest edge of the circumference of the cover and 3.15 feet north of the nearest or northerly edge of the curb stone on the south side of the easterly path.

NOTE:— Occupied with a 16-foot tripod and platform.

In 1938 this station was incorporated into the first order triangulation scheme of the Boston City Planning Board.

NOTE:— Reference Ties Check.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE.— One of these forms must be used for every station recovered.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WATER STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: K. T. ADAMS YEAR: 1933 LOCALITY: NEWTON

Surface-station mark, Note, 1b
Underground - station mark, Note, None
Reference mark, No. 1 Note, Disc
Reference mark, No. 2 Note, Disc
Reference mark, No. 3 Note, CC
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, meters.
Height of telescope above station mark, meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Fells		00 00 00	
R. M. No. 1	13.330	83 26 45	
R. M. No. 2	13.701	211 01 03	
R. M. No. 3	42.958	304 34 32	
Walnut Hill No. 2	4157.41		339 27 47.73

Detailed Description:

Station WATER is a first order C. and G. S. station in the extreme eastern section of the city of Newton. It is on the top of a very large dirt covered reservoir on the summit of Waban Hill. Two paths running about north and south, and east and west, across the top of the reservoir intersect at about the center of the reservoir. At the intersection of the paths there is a circular cover 45½ feet in diameter, raised about 1 foot above the surface of the paths.

The station mark is a standard disc station marker set in the center of the top of a concrete monument 12 inches in diameter, 18 inches in diameter at the bottom and 42 inches long. It is imbedded in about the center of the path running easterly from the center of the reservoir, 34.5 feet from the center of the raised cover, 11.25 feet from the nearest edge of the circumference of the cover and 3.15 feet north of the nearest or northerly edge of the curb stone on the south side of the easterly path.

Two standard disc reference marks were established. They are cemented into drill holes and countersunk into the top of the granite curbings at the edge of the paths. They are stamped and situated as follows:—

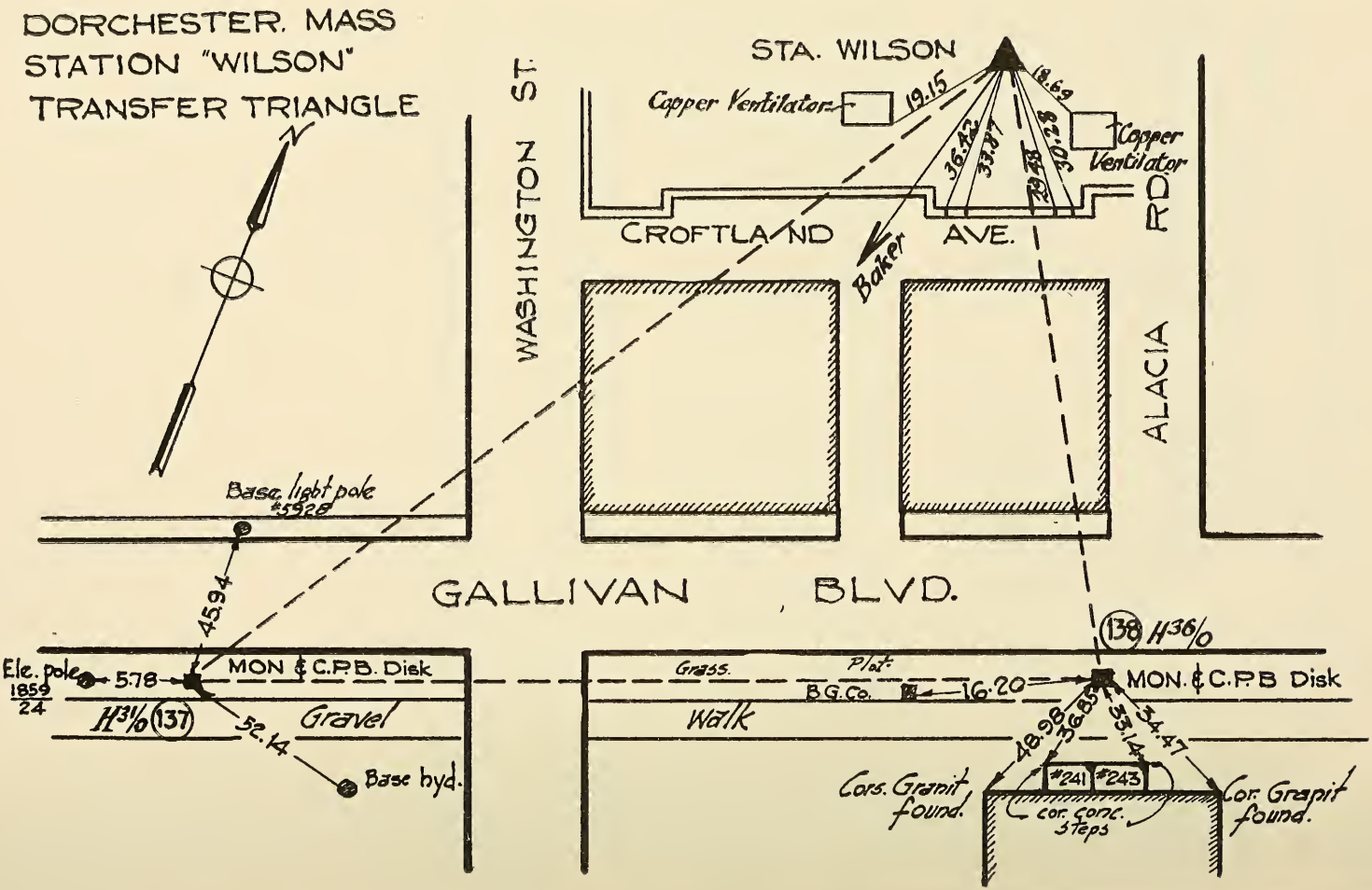
"WATER No. 1" — to the east and south of and about 1 foot above the station mark.

"WATER No. 2" — to the west and south of and about 1 foot higher than the station mark.

In the northwest section of the top of the reservoir, as divided by the paths, there is a row of 6 round cast iron ventilator caps running about north and south. At the center of the rounded top of the fourth cap from the north end of the row, there is inscribed a replica of a standard disc reference mark; a cross, the words "WATER" and "No. 3" inside a circle. It is north and west of the station mark.

The station is best reached from the Boston-Newton City line on Commonwealth Avenue near Lake Street. Follow Commonwealth Avenue westerly about .5 mile to Manet Road, then northerly to the top of the hill where the road ends at the westerly side of the reservoir.

Described by S. E. GAZAN, Surveyor, C. and G. S. Marked by W. H. L.


DORCHESTER. MASS
STATION "WILSON"
TRANSFER TRIANGLE
STA. WILSON
Copper Ventilator
19.15
18.69
36.42
33.87
30.28
39.48
Copper Ventilator
WASHINGTON ST.
CROFTLAND AVE.
Baker
ALACIA RD
Base light pole #5928
45.94
GALLIVAN BLVD.
Ele. pole 1859 24
5.78
MON & C.P.B. Disk
H 3 1/0 (137)
52.14
Gravel
Base hyd.
Grass Plot
B.G.Co.
16.20
MON. & C.P.B Disk
(138) H 3 6/0
Walk
48.98
36.85
33.14
34.47
#241
#243
cor. conc. steps
Cors. Granit found.
Cor. Granit found.

FORM S-63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WILSON STATE: MASSACHUSETTS COUNTY: SUFFOLK
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: DORCHESTER

Surface-station mark, Note
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 4.735 meters.
Height of telescope above station mark, 5.02 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Baker	1098.49		355 43 02.22
No Ref. Marks Ties only			

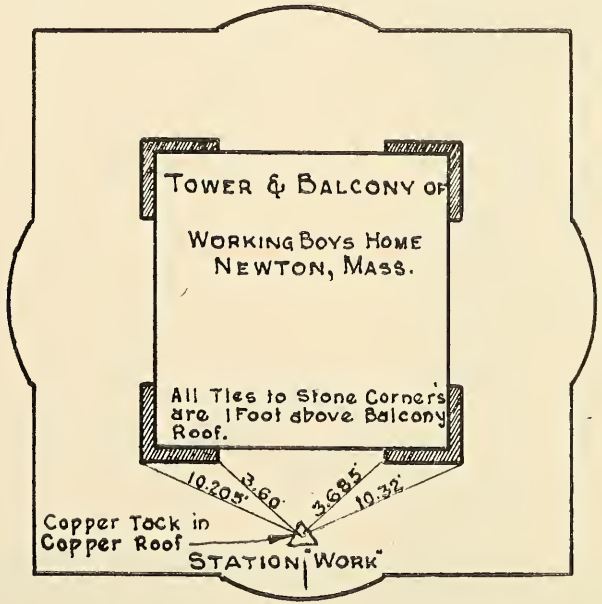
Detailed Description:

A bronze C. P. B. disc set in a concrete pimple 3 inches above the tar and gravel roof of the Woodrow Wilson School on Croftland Avenue, Dorchester. The school is reached over Washington Street and Croftland Avenue, and is one block northeast of the intersection of Washington Street and Gallivan Boulevard, often called the Southern Artery. The view is good from northwest to southwest.

Described by BULLMAN Marked by.....

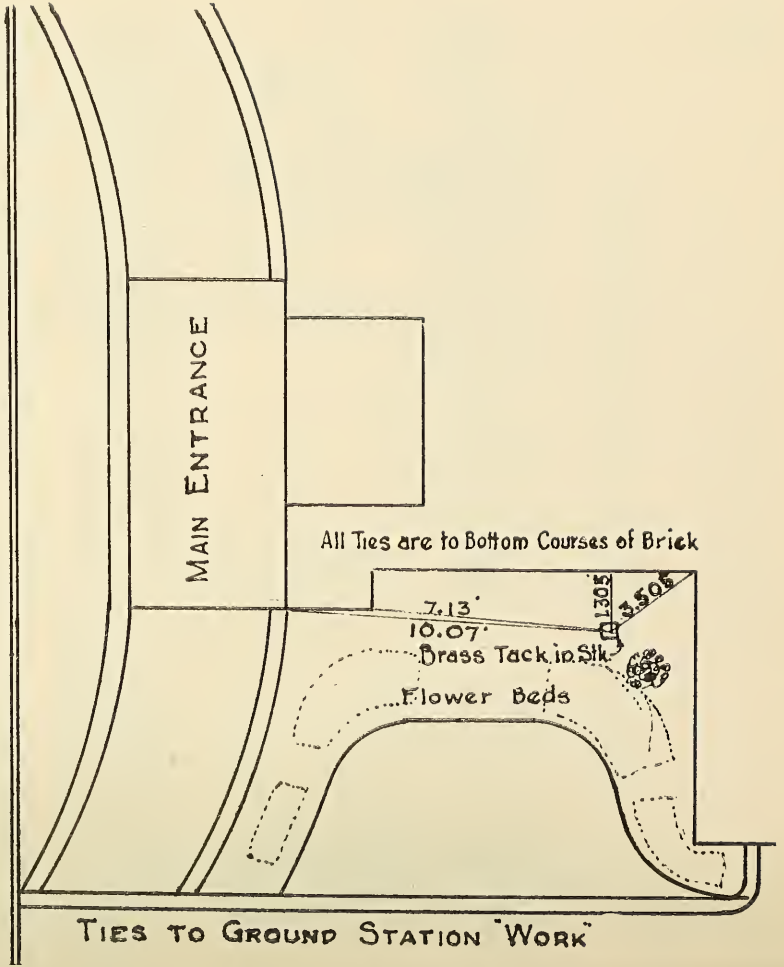
GROUND TRANSFER POINT, "WILSON" MONUMENT No. 137 — (First order traverse point No. H31/0).
Description: This point is a C. P. B. disc set in a concrete monument set flush with the ground on the southeast side of Gallivan Boulevard, near Washington Street.
Southeast 5.78′ from Elevated pole No. 1859/24.
South 45.94′ from base of light pole No. 5928.
West 52.14′ from base of hydrant.

GROUND TRANSFER POINT, "WILSON" MONUMENT No. 138 — (First order traverse point No. H36/0).
Description: This point is a C. P. B. disc set in a concrete monument set flush with the ground on the southeast side of Gallivan Boulevard, opposite Alicia Road.
Northwest 34.47′ from the east corner of granite foundation, No. 243 Gallivan Boulevard.
North 33.14′ from the east corner of concrete steps at No. 243 Gallivan Boulevard.
Northeast 36.85′ from the west corner of concrete steps at No. 241 Gallivan Boulevard.
Northeast 48.98′ from the west corner of granite foundation, No. 241 Gallivan Boulevard.
East 16.20′ from B. G. Co.



TIES TO AERIAL STATION "WORK"

Need



TIES TO GROUND STATION "WORK"

FORM S–63

CITY PLANNING BOARD, BOSTON, MASSACHUSETTS
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WORK STATE: MASSACHUSETTS COUNTY: MIDDLESEX
CHIEF OF PARTY: J. M. DEARBORN YEAR: 1938 LOCALITY: NEWTON

Surface-station mark, See Below Note, Copper Tack
Underground-station mark, Note
Reference mark, Note
Reference mark, Note
Azimuth mark, Note
Witness mark, Note
Height of light above station mark, 1.40 meters.
Height of telescope above station mark, 1.69 meters.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND

Object	Distance	Direction	Azimuth
		° ′ ″	° ′ ″
Need	2550.53		358 49 33.22
No Ref. Marks Ties only			

Detailed Description:

A copper tack set in copper roof of the southerly balcony of the Working Boys' Home, 601 Winchester Street, Newton, Mass. The station mark is located approximately in the center of the double doorway, leading to the southern balcony about midway between the building wall and the ornamental railing around the balcony. Visibility is limited to the southern quadrants, but for future use the northerly quadrants may be made visible by establishing an eccentric position on the northern balcony; the eccentric distance being measured through the doorways from the balcony to balcony. Station is best reached by taking Baker Street from the Veterans of Foreign Wars Parkway, passing Brookline Street on the right, and taking the next left off Baker Street and proceeding thusly to Winchester Street and the Working Boys' Home.

Described by J. M. DEARBORN Marked by.....

TABLE NO. II

Coordinate Data Based on the Massachusetts State Lambert Projection

Table No. II includes the coordinates of the triangulation stations, arranged in alphabetical order, the grid azimuths and the distance in feet of the lines connecting triangulation stations.

Included also in this table are the coordinate data of the transfer or ground stations.

A single scale factor was adopted for the area covered by the Boston triangulation network.

$$\text{Scale Factor} = 0.9999670 = \frac{\text{Grid Length}}{\text{True Length}}$$

TRIANGULATION NET

LAMBERT COORDINATES, GRID AZIMUTHS, GRID DISTANCES
BASED ON COAST GEODETIC SURVEY ADJUSTMENT 1941

STATION	Lambert Coordinates X	Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
BAKER	716,639.09	463,549.99	38 47 24.88	6,200.76	Milhy
Mon. No. 36	716,200.74	464,322.52	257 24 50.89	726.52	Mon. No. 37
Mon. No. 37	716,909.83	464,480.83			
BAPTIST	705,845.69	484,726.70	327 07 56.94	11,611.81	Franklin Pk. 2
			342 28 04.78	6,288.16	Dunn
			30 04 38.24	11,611.38	Faulkner
			54 34 41.41	15,795.45	Walnut Hill 2
			123 34 29.94	8,335.87	Corey
			146 14 00.29	11,474.06	Lincam
			165 52 38.67	8,236.52	Oxford
Point A	704,101.49	485,544.36	216 01 09.63	2,103.55	Mon. No. 26
Mon. No. 26	705,338.50	487,245.75			
BELLE	696,334.34	464,981.74	293 02 07.23	4,373.92	Rose
			316 48 47.51	8,578.43	Rogers
			324 07 59.73	12,283.78	Fair
			41 20 44.19	3,816.22	View
			98 27 49.37	10,076.57	Brow
			129 40 54.05	15,208.19	Peabody
			162 23 40.39	11,110.44	Walnut Hill 2
			200 50 38.63	10,376.14	Faulkner
Mon. No. 28	696,148.27	464,982.83	166 44 40.82	702.38	Mon. No. 29
Mon. No. 29	696,987.22	465,666.50			
BRIHY	695,531.08	491,829.08	64 38 21.60	8,178.98	Water
Mon. No. 30	695,584.15	492,110.88	281 16 19.96	285.98	Mon. No. 31
Mon. No. 31	695,864.61	492,054.98			
BROW	686,367.51	466,464.84	79 59 25.23	6,404.25	Need
			138 05 55.01	9,743.50	Work
			168 04 33.35	8,409.11	Peabody
			215 57 28.32	11,250.80	Walnut Hill
Mon. No. 42 Brook Pt. B					
BULK	731,434.96	497,980.03	352 33 21.83	4,868.09	Gov'r's Isl'd 3
			75 15 11.39	12,241.71	Federal
CASTLE	731,535.15	488,115.43	348 47 52.43	7,104.84	Thompson
			40 20 48.59	10,578.81	Mile
			76 01 23.22	8,787.96	Sobig
CHAHY	718,369.02	502,045.77	350 18 04.08	7,285.99	Federal
			17 40 42.68	3,915.19	State
			42 56 41.92	7,773.22	Filene
			115 46 11.58	3,228.63	Hood
Mon. No. 38	718,688.08	501,500.27	107 34 53.52	440.34	Mon. No. 39
Mon. No. 39	718,268.31	501,633.28			
CITY	715,131.83	486,766.18	305 05 35.54	11,677.13	Mile
			340 29 42.13	8,009.92	St. Margaret
			77 36 46.83	9,507.46	Baptist

TRIANGULATION NET — Continued

STATION	Lambert Coordinates X	Lambert Coordinates Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
CITY			112 49 18.14	8,593.79	Sears
			145 00 33.14	11,537.74	Necco
			167 53 01.34	9,808.02	Filene
Mon. No. 40	715,371.87	486,305.87	225 56 42.87	419.20	Mon. No. 41
Mon. No. 41	715,673.14	486,597.36			
CODMAN	715,637.87	470,088.20	144 27 19.64	6,004.22	Franklin Pk. 2
			193 21 48.43	9,381.75	St. Margaret
			346 22 51.75	3,032.14	Wilson
			66 37 36.13	6,668.63	Lewen
			109 41 44.02	4,742.68	Paine
Mon. No. 24 WIG	715,623.86	470,448.29	291 28 13.69	201.90	Point B
B	715,811.75	470,374.39	344 44 26.28	201.11	Point A
A	715,864.68	470,180.37			
COREY	698,900.55	489,336.67	23 17 42.13	14,986.58	Walnut Hill 2
			36 21 34.58	8,166.50	Singtre
			84 38 01.07	10,807.61	Water
			126 29 25.71	4,191.11	Brihy
			148 47 23.62	7,055.67	Palm
DEDHAM C. H. 2	687,552.68	455,149.67	167 44 13.55	8,219.77	Lynch
			203 15 09.60	9,186.18	Kilmer
			221 56 35.01	9,366.77	View
Mon. No. 48	688,679.19	456,344.88	347 59 23.04	1,063.31	Mon. No. 49
Mon. No. 49	688,900.45	455,304.85			
DUNN	707,721.85	478,787.85	310 45 24.93	5,842.42	Franklin Pk. 2
			61 53 58.05	8,723.74	Faulkner
Mon. No. 50	707,057.07	478,698.10	216 42 43.68	496.83	Mon. No. 51
Mon. No. 51	707,354.07	479,096.38			
EBHIG 2	725,571.16	503,493.40	313 14 08.91	8,048.69	Bulk
			327 52 06.23	12,210.77	Gov'r's Isl'd 3
			34 41 49.25	10,495.93	Federal
			78 38 05.95	7,346.19	Chahy
Mon. No. 16	725,823.33	503,347.49	89 54 08.08	252.03	Point B
Point B	725,571.30	503,347.06			
FAIR	703,531.43	455,027.19	88 49 19.82	7,753.64	Harding Ter.
			90 26 21.03	15,979.22	Dedham C. H.
			126 06 41.90	12,029.26	View
Point A	703,384.17	454,697.49	142 33 52.76	358.91	Mon. No. 46
Mon. No. 46	703,166.00	454,982.48			
FAULKNER	700,026.44	474,678.79	97 12 59.10	7,108.98	Walnut Hill 2
			175 36 27.59	14,701.06	Corey
Mon. No. 52	700,440.08	473,760.48	217 00 06.58	880.75	Mon. No. 53
Mon. No. 53	700,970.15	474,463.86			
FEDERAL	719,596.49	494,863.92	277 48 46.88	12,586.00	Gov'r's Isl'd 3
			299 28 40.57	13,713.98	Castle
			338 58 06.88	9,504.18	Sobig
			28 52 11.96	9,246.98	City
			102 52 52.34	6,691.73	Filene
			145 00 15.29	4,213.35	State
Mon. No. 54	719,628.86	496,014.11	260 05 07.64	929.61	Mon. No. 55
Mon. No. 55	720,544.59	496,174.17			
Mon. No. 56	720,683.28	494,443.24	37 55 47.00	728.90	Mon. No. 57
Mon. No. 57	720,235.23	493,868.31			

TRIANGULATION NET — Continued

STATION	Lambert Coordinates X	Lambert Coordinates Y	Grid Azimuth °	′	″	Grid Distance in Feet	To Station
FILENE	713,073.16	496,355.71	43	08	17.51	8,573.72	Sears
			88	16	28.03	4,559.66	Necco
			198	36	26.80	7,484.99	Hood
Mon. No. 58	713,050.01	496,113.00	245	28	56.44	243.85	Mon. No. 59
Mon. No. 59	713,271.87	496,214.19					
FOREST	705,901.39	472,963.69	252	09	43.65	6,561.44	Franklin Pk. 2
			34	40	20.40	6,907.49	Heart
			106	16	27.63	6,120.18	Faulkner
FRANKLIN PK. 2	712,147.40	474,973.62	88	36	23.81	12,124.55	Faulkner
Mon. No. 60	712,390.31	475,103.94	125	05	24.14	297.32	Mon. No. 61
Mon. No. 61	712,155.21	475,269.11					
GOV'R'S ISL'D 3	732,065.65	493,152.97	6	00	42.65	5,065.40	Castle
			51	40	31.88	11,546.42	Sobig
HAGE	720,598.11	471,654.97	43	15	06.12	6,197.10	Wilson
			69	11	13.97	11,855.24	Lewen
			72	28	13.64	5,201.80	Codman
			111	26	24.96	9,078.98	Franklin Pk. 2
			159	44	00.59	8,059.94	St. Margaret
			205	57	25.50	9,340.14	Mile
Mon. No. 62	720,840.27	471,615.50	155	22	30.48	231.08	Mon. No. 63
Mon. No. 63	720,745.82	471,826.40					
HARDING TER.	695,779.43	454,867.81	91	57	44.16	8,231.58	Dedham C. H.
			164	49	30.53	7,510.84	View
HEART	701,971.84	467,282.84	165	15	46.72	7,647.53	Faulkner
			358	26	14.58	8,559.04	Rogers
			21	53	28.19	4,324.43	Rose
			67	47	44.98	6,089.04	Belle
			132	39	04.82	12,233.98	Walnut Hill 2
Mon No. 64	702,950.80	466,049.34	185	05	01.59	964.77	Mon. No. 65
Mon No. 65	703,036.29	467,010.31					
HOOD	715,461.49	503,449.44					
Mon. No. 66	715,643.28	503,802.94	331	23	46.55	278.83	Mon. No. 67
Mon. No. 67	715,776.77	503,558.14					
HOUGHTON	704,352.71	498,182.56	5	23	52.72	5,492.64	Oxford
			51	16	11.92	6,261.27	Lincam
			85	59	33.49	3,823.31	Stadium
Mon. No. 68	703,065.06	497,230.91	181	59	08.88	3,890.28	Mon. No. 69
Mon. No. 69	703,095.91	498,120.66					
HOUSE	720,762.27	484,100.79	357	08	51.88	3,151.28	Skinner
Point A	720,987.76	484,247.25	353	57	19.61	276.73	Point B
Point B	721,016.90	483,972.06					
KILMER	691,179.26	463,589.68	85	39	33.63	5,387.89	Lynch
			9	00	18.27	11,257.27	Need
			120	51	34.35	5,605.31	Brow
Mon. No. 72	691,207.28	463,397.74	118	37	13.37	239.66	Mon. No. 73
Mon. No. 73	690,996.90	463,512.54					

TRIANGULATION NET — Continued

STATION	Lambert Coordinates X	Lambert Coordinates Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
LEWEN	709,516.47	467,442.62	199 15 24.10	7,977.33	Franklin Pk. 2
			272 31 26.49	6,842.00	Wilson
			298 39 48.71	8,117.39	Baker
			339 38 34.80	9,308.11	Milhy
			358 17 55.25	4,740.77	Oriental
			359 30 41.61	7,797.26	Tucker
			39 59 31.38	11,376.14	Rogers
			48 41 37.08	6,365.47	Quarry
			88 47 12.38	7,546.32	Heart
			127 19 32.18	11,934.10	Faulkner
			146 47 02.65	6,599.32	Forest
Mon. No. 74	709,623.78	567,547.31	134 08 50.11	154.41	Mon. No. 75
Mon. No. 75	709,512.98	467,654.86			
LINCAM	699,468.28	494,265.19	6 34 15.96	4,961.11	Corey
			58 15 11.49	4,629.92	Brihy
			104 40 24.11	4,366.22	Palm
			145 39 42.35	6,052.10	Mt. Auburn
Point B	699,259.69	494,641.28	284 34 32.65	357.78	Mon. No. 22
Point C	699,809.29	494,453.37	115 42 07.47	225.65	Mon. No. 22
Mon. No. 22 Cam	699,605.95	494,551.24			
LYNCH	685,806.82	463,181.89	110 41 14.05	6,142.11	Need
			189 41 31.01	3,331.49	Brow
MARINE	722,797.39	506,475.27	317 04 14.43	4,072.51	Ebhig 2
			15 24 42.95	12,044.47	Federal
			44 59 33.69	6,263.46	Chahy
Point A	723,112.47	505,907.77	58 49 58.43	622.87	Point B
Point B	722,579.50	505,585.41			
MILE	724,686.27	480,052.90	83 03 50.12	6,930.74	St. Margaret
			103 26 37.42	3,873.32	Skinner
			135 53 25.27	5,637.66	House
MILHY	712,754.47	458,715.86	106 20 21.35	3,305.01	Tucker
			142 09 58.06	5,049.53	Oriental
Mon. No. 79	712,582.52	458,952.88	281 33 40.18	371.23	Mon. No. 79A
Mon. No. 79B	712,946.22	458,878.48			
MT. AUBURN	696,054.43	499,262.54	11 45 28.86	397.75	Palm
NAIR	724,725.33	474,313.69	57 12 38.56	4,909.45	Hage
			125 19 04.68	8,479.72	St. Margaret
			179 36 36.42	5,739.34	Mile
NECCO	708,515.57	496,218.41	12 02 13.71	6,256.57	Sears
			53 10 24.95	5,846.14	Oxford
			115 15 33.14	4,602.97	Houghton
Mon. No. 80	707,943.96	492,568.14	274 55 03.83	1,334.61	Mon. No. 81
Mon. No. 81	709,273.66	492,453.73			
NEED	680,060.74	465,351.69			
Mon. No. 43 Glen					
Point A					

TRIANGULATION NET — Continued

STATION	Lambert X	Coordinates Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
ORIENT	732,026.50	507,403.35	312 54 51.59	4,782.14	Shea
			3 35 31.11	9,441.87	Bulk
			58 47 49.31	7,547.13	Ebhig 2
			84 15 27.49	9,275.66	Marine
Mon. No. 89	731,623.21	507,013.65	153 17 36.02	474.07	Point LPBT
Point LPBT	731,410.15	507,437.15			
ORIENTAL	709,657.22	462,703.94	1 23 28.78	3,059.20	Tucker
Mon. No. 76	709,394.68	462,451.53	315 25 42.71	391.41	Mon. No. 27
Mon. No. 27	709,669.37	462,172.70			
OXFORD	703,836.00	492,714.28	55 36 50.18	5,980.54	Corey
			109 32 57.00	4,634.90	Lincam
			147 37 20.26	6,157.20	Stadium
Mon. No. 90	703,640.42	492,152.96	279 40 38.69	652.94	Mon. No. 91
Mon. No. 91	704,284.07	492,043.20			
Mon. No. 92	704,089.44	493,122.62	126 18 21.15	437.43	Mon. No. 93
Mon. No. 93	703,736.93	493,381.62			
PAINE	711,172.65	471,686.59	196 31 02.72	3,428.51	Franklin Pk. 2
			21 19 04.34	4,555.68	Lewen
Point G	711,073.91	471,850.85	239 03 58.93	453.37	Mon.No.25Blue
Mon. No. 25 Blue	711,462.79	472,083.90	12 58 34.17	490.95	Point H
Point H	711,352.55	471,605.49			
PALM	695,244.46	495,371.19	355 22 25.78	3,553.69	Brihy
			45 14 18.03	10,005.25	Water
Point B	695,142.39	495,471.15	41 05 38.38	170.03	Mon. No. 95
Point C	695,295.28	485,283.10	102 45 19.14	271.35	Mon. No. 95
Mon. No. 95 Abbat	695,030.63	495,343.01			
PEABODY	684,630.06	474,692.50	263 59 03.27	8,390.01	Walnut Hill 2
			26 04 00.73	10,398.53	Need
			78 26 23.97	4,868.51	Work
POPE	728,073.71	513,092.85	325 12 37.05	6,927.84	Orient
			30 33 40.49	2,587.98	Powderhorn 4
POWDERHORN 4	726,757.83	510,864.38	303 18 04.39	6,303.78	Orient
			9 08 44.51	7,465.89	Ebhig 2
			42 03 39.55	5,911.80	Marine
QUARRY	704,734.79	463,240.87	145 38 41.45	4,896.06	Heart
			29 15 57.39	5,174.34	Rogers
ROGERS	702,205.24	458,726.98	340 16 47.20	3,930.30	Fair
			111 59 43.86	9,050.66	View
Mon. No. 104	701,287.15	458,328.95	182 50 56.75	569.75	Mon. No. 105
Mon. No. 105	701,315.47	458,898.00			
ROSE	700,359.50	463,270.23	337 53 24.25	4,903.86	Rogers
ST. MARGARET	717,806.25	479,215.93	53 08 31.01	7,072.47	Franklin Pk. 2
			87 34 09.37	10,093.48	Dunn
			114 44 15.57	13,169.04	Baptist
			135 46 05.72	15,189.27	Sears
Mon. No. 127	716,865.54	479,353.39	16 25 07.31	803.99	Mon. No. 128
Mon. No. 128	716,638.29	478,582.19			

TRIANGULATION NET — Continued

STATION	Lambert Coordinates X	Lambert Coordinates Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
SEARS	707,210.79	490,099.41	14 15 21.84	5,543.42	Baptist
			118 16 55.30	8,792.05	Lincam
			127 46 09.85	4,269.28	Oxford
			160 31 37.82	8,573.56	Houghton
Mon. No. 108	708,754.59	489,793.03	159 42 07.91	823.96	Mon. No. 109
Mon. No. 109	708,468.76	490,565.82			
SHEA	735,528.81	504,147.17	33 34 36.72	7,402.24	Bulk
			86 14 37.08	9,979.09	Ebhig 2
Mon. No. 111	735,915.04	504,282.08	115 36 41.95	290.00	Mon. No. 110
Mon. No. 110	735,653.53	504,407.44			
SINGTRE	694,059.03	482,760.09	133 14 23.65	8,124.62	Water
Mon. No. 112	693,957.07	482,784.32	224 38 37.58	141.03	Mon. No. 113
Mon. No. 113	694,056.17	482,884.66			
SKINNER	720,919.08	480,953.41			
Mon. No. 114	720,835.21	481,697.74	47 50 33.14	400.24	Mon. No. 115
Mon. No. 115	720,538.51	481,429.11			
Mon. No. 15 Bridge					
SLADE	732,146.76	511,414.48	1 43 02.29	4,012.93	Orient
			84 10 17.24	5,416.93	Powderhorn 4
			112 23 41.82	4,405.30	Pope
SOBIG	723,007.35	485,992.87	296 04 02.80	11,030.04	Thompson
			344 13 01.80	6,172.68	Mile
			22 30 29.95	5,455.00	Skinner
			37 30 18.60	8,542.74	St. Margaret
			49 52 36.86	2,936.04	House
			95 36 28.76	7,913.40	City
			136 12 35.43	14,355.37	Filene
Mon. No. 118	723,084.49	486,142.62	335 08 44.95	151.89	Mon. No. 119
Mon. No. 119	723,148.33	486,004.80	22 33 14.38	145.19	Mon. No. 120
Mon. No. 120	723,092.64	485,870.71			
STADIUM	700,538.83	497,914.26	16 21 01.54	3,802.87	Lincam
			64 20 36.27	5,873.46	Palm
			106 44 02.16	4,682.70	Mt. Auburn
Mon. No. 121	699,461.44	498,447.67	44 41 59.16	1,271.17	Mon. No. 122
Mon. No. 122	698,567.31	497,544.12			
STATE	717,180.07	498,315.47	64 29 24.64	4,550.54	Filene
			161 29 31.90	5,413.98	Hood
Mon. No. 125	716,549.24	498,357.42	314 39 12.81	466.61	Mon. No. 126
Mon. No. 126	716,881.17	498,029.48			
THOMPSON	732,915.39	481,145.95	82 26 01.89	8,301.40	Mile
TUCKER	709,582.94	459,645.64	82 54 07.74	7,434.68	Rogers
Mon. No. 70	709,837.44	459,132.23	193 37 59.12	420.87	Point 71A
Point 71A	709,936.64	459,541.24			
VIEW	693,813.35	462,116.76	97 34 39.78	8,077.07	Lynch
			119 12 46.35	3,017.93	Kilmer
Mon. No. 133	694,315.10	461,709.54	219 35 28.29	640.93	Mon. No. 134
Mon. No. 134	694,723.57	462,203.45			

TRIANGULATION NET — Concluded

STATION	Lambert Coordinates X	Y	Grid Azimuth ° ′ ″	Grid Distance in Feet	To Station
WALNUT HILL 2	692,973.87	475,571.79	159 14 39.35	13,639.30	Water
			188 35 04.78	7,269.75	Singtre
Point A	692,984.88	475,276.52	133 41 59.28	210.04	Point B
B	692,833.03	475,421.63	145 45 43.93	256.47	Point C
C	692,688.73	475,633.66			
WATER	688,140.31	488,325.90			
WILSON	716,351.83	467,141.31	355 25 41.05	3,603.79	Baker
			23 07 14.57	9,161.29	Milhy
Mon. No. 137	716,111.49	466,109.01	244 56 00.33	660.47	Mon. No. 138
Mon. No. 138	716,709.75	466,388.83			
WORK	679,860.31	473,716.88	358 37 38.84	8,367.59	Need

TABLE NO. III

Geographic Positions of Triangulation Stations

Table No. III includes the geographic positions (latitudes and longitudes) of all triangulation stations, arranged in alphabetical order. The positions are based on the United States Coast and Geodetic Survey adjustment of the Boston network made in 1940, using North American Datum 1927.

The geographic position data include, in addition to the coordinates (latitudes and longitudes), the geodetic azimuths, back azimuths, the distances in meters and feet for the triangle sides and the logarithm for the distance in meters. The azimuths increase in a clockwise direction through 360 degrees from the south point as zero.

GEOGRAPHIC POSITIONS

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
BAKER						
42–16–16.651	39–04–46.89	219–04–11.93	Milhy	3.2764731	1890.05	6200.9
71–04–08.598						
BAPTIST						
42–19–46.374	327–23–43.89	147–24–39.95	Franklin Pk.2	3.5489328	3539.43	11612.3
71–06–30.865	342–43–50.92	162–44–07.49	Dunn	3.2783928	1898.42	6228.4
	30–20–23.47	210–19–30.93	Faulkner	3.5489158	3539.29	11611.8
	54–50–27.61	234–48–31.91	Walnut Hill 2	3.6825630	4814.63	15796.0
	123–50–16.57	303–49–14.48	Corey	3.4049818	2540.87	8336.2
	146–29–46.84	326–28–50.02	Lincam	3.5437460	3497.41	11474.4
	166–08–24.43	346–08–06.73	Oxford	3.3997718	2510.57	8236.8
BELLE						
42–16–31.730	293–16–29.42	113–17–05.36	Rose	3.1249033	1333.22	4374.1
71–08–38.586	317–03–08.93	137–04–01.20	Rogers	3.4174429	2614.83	8578.8
	324–22–21.37	144–23–25.35	Fair	3.5733640	3744.24	12284.2
	41–35–04.61	221–34–41.95	View	3.0656639	1163.23	3816.4
	98–42–09.92	278–40–40.78	Brow	3.4873444	3071.46	10076.9
	129–55–14.17	309–53–29.73	Peabody	3.6661083	4635.62	15208.7
	162–38–01.15	342–37–31.45	Walnut Hill 2	3.5297619	3386.58	11110.8
	201–05–00.48	21–05–33.90	Faulkner	3.5000662	3162.76	10376.5
BRIHY						
42–20–56.981	62–52–36.97	244–51–30.55	Water	3.3967301	2493.04	8179.2
71–08–47.791						
BROW						
42–16–46.771	80–12–16.70	260–11–20.23	Need	3.2904999	1952.090	6404.48
71–10–51.087	138–18–46.79	318–17–48.77	Work	3.4727445	2969.92	9743.8
	168–17–24.60	348–17–09.32	Peabody	3.4087793	2563.18	8409.4
	216–10–20.24	36–11–19.70	Walnut Hill 2	3.5352148	3429.37	11251.2
BULK						
42–21–55.998	352–52–56.33	172–53–01.74	Gov'r's Isl'd 3	3.1713858	1483.84	4868.2
71–00–49.193	75–34–47.91	255–33–01.59	Federal	3.5718705	3731.39	12242.1
CASTLE						
42–20–18.544	349–07–27.97	169–07–39.99	Thompson	3.3355866	2165.64	7105.1
71–00–48.608	40–40–24.58	220–39–22.78	Mile	3.5084659	3224.53	10579.1
	76–20–59.58	256–19–43.01	Sobig	3.4279182	2678.66	8788.2
CHAHY						
42–22–36.861	350–35–43.98	170–35–54.66	Federal	3.3465139	2220.82	7286.1
71–03–42.959	17–58–23.57	197–58–12.72	State	3.0767762	1193.37	3915.2
	43–14–23.41	223–13–35.61	Filene	3.3746293	2369.35	7773.4
	116–03–50.93	296–03–24.88	Hood	2.9930511	984.13	3228.8
CITY						
42–20–06.082	305–22–44.58	125–24–09.91	Mile	3.5513681	3559.33	11677.6
71–04–27.104	340–46–52.64	160–47–16.27	St. Margaret	3.3876600	2441.52	8010.2
	77–53–57.58	257–52–34.23	Baptist	3.4620941	2897.97	9507.8
	113–06–27.02	293–05–16.13	Sears	3.4182159	2619.48	5894.1
	145–17–42.56	325–16–43.62	Necco	3.5461503	3516.82	11538.1
	168–10–10.54	348–09–52.50	Filene	3.4756119	2989.59	9808.3

GEOGRAPHIC POSITIONS — Continued

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
CODMAN						
42-17-21.300	144-44-33.39	324-44-02.35	Franklin Pk.2	3.2624882	1830.16	6004.4
71-04-21.479	193-39-01.06	13-39-20.89	St. Margaret	3.4563140	2859.66	9382.1
	346-40-06.23	166-40-12.49	Wilson	2.9657769	924.22	3032.2
	66-54-49.60	246-53-54.69	Lewen	3.3080699	2032.68	6668.9
	109-58-58.19	289-58-18.28	Paine	3.1600543	1445.621	4742.84
COREY						
42-20-32.219	23-32-26.42	203-31-32.78	Walnut Hill 2	3.6597340	4568.08	14987.1
71-08-03.062	36-36-19.10	216-35-35.44	Singtre	3.3960689	2489.25	8166.8
	84-52-45.31	264-51-08.77	Water	3.5177595	3294.27	10808.0
	126-44-09.63	306-43-39.50	Brihy	3.1063538	1277.48	4191.2
	149-02-08.59	329-01-36.02	Palm	3.3325690	2150.65	7055.9
DEDHAM C. H. 2						
42-14-54.946	167-57-15.86	347-57-00.52	Lynch	3.3988934	2505.49	8220.1
71-10-35.892	203-28-10.79	23-28-43.52	Kilmer	3.4471680	2800.06	9186.5
	222-09-36.71	42-10-32.94	View	3.4556236	2855.12	9367.2
DUNN						
42-18-47.620	311-01-29.06	131-02-08.55	Franklin Pk.2	3.2506240	1780.84	5842.6
71-06-06.257	62-10-00.20	242-08-51.11	Faulkner	3.4247333	2659.09	8724.0
EBHIG 2						
42-22-50.785	313-32-52.95	133-33-45.32	Bulk	3.3897518	2453.31	8048.9
71-02-06.901	328-10-49.70	148-11-47.48	Gov'r's Isl'd 3	3.5707707	3721.95	12211.1
	35-00-34.00	214-59-39.95	Federal	3.5050491	3199.26	10496.2
	78-56-49.40	258-55-44.66	Chahy	3.3500904	2239.19	7346.4
FAIR						
42-14-53.083	89-04-45.50	269-03-36.20	Harding Ter.	3.3735360	2363.39	7753.9
71-07-03.447	90-41-45.77	270-39-22.94	Dedham C. H.	3.6875867	4870.65	15979.8
	126-22-07.65	306-20-41.02	View	3.5642702	3666.66	12029.7
FAULKNER						
42-18-07.370	97-27-53.94	277-26-50.80	Walnut Hill 2	3.3358349	2166.88	7109.2
71-07-48.916	175-51-21.02	355-51-11.49	Corey	3.6513814	4481.07	14701.6
FEDERAL						
42-21-25.852	278-06-35.9	98-08-27.7	Gov's's Isl'd 3	3.5839916	3836.3	12586.5
71-03-27.102	299-46-30.45	119-48-17.22	Castle	3.6211944	4180.17	13714.4
	399-15-56.41	159-16-26.59	Sobig	3.4619463	2896.99	9504.5
	29-10-01.59	209-09-21.17	City	3.4500299	2818.58	9247.3
	103-10-42.34	283-09-43.87	Filene	3.3095690	2039.71	6691.9
	145-18-06.14	325-17-44.61	State	3.1086553	1284.27	4213.5
FILENE						
42-21-40.914	43-25-08.70	223-24-15.84	Sears	3.4172007	2613.37	8574.0
71-04-53.887	88-33-18.17	268-32-37.26	Necco	3.1429601	1389.82	4559.8
	198-53-19.36	18-53-41.12	Hood	3.3582182	2281.49	7485.2
FOREST						
42-17-50.168	252-25-30.48	72-26-26.50	Franklin Pk.2	3.3010294	2000.00	6561.7
71-06-30.842	34-56-06.93	214-55-31.51	Heart	3.3233517	2105.48	6907.7
	106-32-14.09	286-31-21.54	Faulkner	3.2707923	1865.49	6120.4
FRANKLIN PK. 2						
24-18-09.732	88-53-06.31	268-51-17.74	Faulkner	3.5676949	3695.68	12124.9
71-05-07.602						

GEOGRAPHIC POSITIONS — Continued

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
GOV'R'S ISL'D 3						
42-21-08.278	6-20-23.11	186-20-18.09	Castle	3.1886452	1543.99	5065.6
71-00-41.160	52-00-12.74	231-58-51.14	Sobig	3.5464772	3519.47	11546.8
HAGE						
42-17-36.527	43-33-04.80	223-32-26.58	Wilson	3.2762216	1888.95	6197.3
71-03-15.377	69-29-11.48	249-27-32.09	Lewen	3.5579435	3613.63	11855.7
	72-46-10.59	252-45-26.11	Codman	3.2001870	1585.58	5202.0
	111-44-22.30	291-43-06.77	Franklin Pk.2	3.4420683	2767.38	9079.3
	160-01-56.73	340-01-32.07	St. Margaret	3.3903615	2456.75	8060.2
	206-15-23.61	26-16-00.63	Mile	3.4543845	2846.98	9340.5
HARDING TER.						
42-14-51.839	92-11-58.71	272-10-45.18	Dedham C. H.	3.3995148	2509.08	8231.9
71-08-46.525	165-03-46.57	345-03-29.25	View	3.3597203	2289.39	7511.1
HEART						
42-16-54.223	165-30-58.87	345-30-41.75	Faulkner	3.3675509	2331.05	7647.8
71-07-23.463	358-41-25.27	178-41-27.02	Rogers	3.4164588	2608.91	8559.4
	22-08-39.67	202-08-25.09	Rose	3.1199606	1318.14	4324.6
	68-02-57.23	248-02-06.70	Belle	3.2685800	1856.01	6089.3
	132-54-16.28	312-52-56.03	Walnut Hill 2	3.5715991	3729.06	12234.4
HOOD						
42-22-50.873						
71-04-21.602						
HOUGHTON						
42-21-59.367	05-39-25.76	185-39-20.90	Oxford	3.2238105	1674.21	5492.8
71-06-49.930	51-31-45.04	231-31-01.04	Lincam	3.2806880	1908.48	6261.4
	86-14-10.24	266-13-35.99	Stadium	3.0664628	1165.37	3823.4
HOUSE						
42-19-39.467	357-26-50.35	177-26-51.61	Skinner	2.9825112	960.53	3151.3
71-03-12.326						
KILMER						
42-16-18.185	85-53-08.26	265-52-20.18	Lynch	3.2154488	1642.29	5388.1
71-09-47.230	99-13-52.69	279-12-13.27	Need	3.5354634	3431.34	11257.7
	121-05-09.21	301-04-26.25	Brow	3.2326287	1708.55	5605.5
LEWEN						
42-16-55.460	199-31-43.35	19-32-07.23	Franklin Pk. 2	3.3858902	2431.59	7977.6
71-05-43.088	272-47-43.93	92-48-45.09	Wilson	3.3192144	2085.52	6842.2
	298-56-07.64	118-57-11.20	Baker	3.3934472	2474.27	8117.7
	339-54-52.56	159-55-21.15	Milhy	3.4528933	2837.22	9308.4
	358-34-13.29	178-34-14.35	Oriental	3.1598844	1445.06	4741.0
	359-46-59.41	179-46-59.67	Tucker	3.3759756	2376.71	7797.6
	40-15-49.01	220-14-43.24	Rogers	3.5400251	3467.57	11376.5
	48-57-54.53	228-57-11.56	Quarry	3.2878606	1940.26	6365.7
	89-03-31.80	269-02-24.26	Heart	3.3617643	2300.19	7546.5
	127-35-51.93	307-34-27.26	Faulkner	3.5608190	3637.63	11934.5
	147-03-22.91	327-02-50.78	Forest	3.3035307	2011.55	6599.6
LINCAM						
42-21-20.882	06-49-06.97	186-49-01.69	Corey	3.1796060	1512.19	4961.2
71-07-55.219	58-30-00.82	238-29-25.40	Brihy	3.1496030	1411.25	4630.1
	104-55-16.35	284-54-38.49	Palm	3.1241392	1330.88	4366.4
	145-54-32.47	325-54-02.02	Mt. Auburn	3.2659402	1844.76	6052.4

GEOGRAPHIC POSITIONS — Continued

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
LYNCH						
42–16–14.360	110–54–00.15	290–53–08.81	Need	3.2723477	1872.18	6142.3
71–10–58.708	189–54–18.12	09–54–23.24	Brow	3.0065377	1015.17	3330.6
MARINE						
42–23–20.389	317–22–31.46	137–22–56.23	Ebhig 2	3.0938918	1241.34	4072.6
71–02–43.646	15–43–02.22	195–42–32.93	Federal	3.5648142	3671.25	12044.8
	45–17–52.01	225–17–12.03	Chahy	3.2808405	1909.15	6263.6
MILE						
42–18–59.273	83–22–24.11	263–21–22.42	St. Margaret	3.3248151	2112.59	6931.1
71–02–20.379	103–45–14.01	283–44–40.29	Skinner	3.0721147	1180.63	3873.5
	136–11–59.28	316–11–24.30	House	3.2351290	1718.42	5637.8
MILHY						
42–15–29.096	106–37–05.81	286–36–37.48	Tucker	3.0032034	1007.40	3305.1
71–05–00.580	142–26–43.17	322–26–15.64	Oriental	3.1872798	1539.15	5049.7
MT. AUBURN						
42–22–10.392	11–59–47.98	191–59–40.56	Palm	3.0833395	1211.54	3974.9
71–08–40.409						
NAIR						
42–18–02.575	57–31–12.64	237–30–35.56	Hage	3.1750660	1496.46	4909.6
71–02–20.272	125–37–37.32	305–36–35.57	St. Margaret	3.4124128	2584.72	8480.0
	179–55–11.29	359–55–11.22	Mile	3.2428906	1749.41	5739.5
NECCO						
42–21–39.774	12–18–25.37	192–18–13.41	Sears	3.2803664	1907.07	6256.8
71–05–54.601	53–26–36.72	233–25–54.58	Oxford	3.2508980	1781.96	5846.3
	115–31–44.53	295–31–07.25	Houghton	3.1470704	1403.04	4603.1
NEED						
42–16–35.999						
71–12–15.034						
ORIENT						
42–23–29.053	313–14–36.16	133–15–07.44	Shea	3.1636524	1457.65	4782.3
71–00–40.594	3–55–13.87	183–55–08.07	Bulk	3.4590875	2877.98	9442.2
	59–07–30.51	239–06–32.33	Ebhig 2	3.3618114	2300.44	7547.4
	84–35–08.33	264–33–45.37	Marine	3.4513752	2827.32	9276.0
ORIENTAL						
42–16–08.641	01–39–47.34	181–39–46.54	Tucker	2.9696381	932.48	3059.3
71–05–41.515						
OXFORD						
42–21–05.371	55–52–20.35	235–51–35.95	Corey	3.2607677	1822.92	5980.7
71–06–57.141	109–48–27.19	289–47–48.06	Lincam	3.1500675	1412.76	4635.0
	147–52–51.02	327–52–21.64	Stadium	3.2734154	1876.79	6157.4
PAINE						
42–17–37.307	196–47–35.85	16–47–44.72	FranklinPk.2	3.0191360	1045.05	3428.6
71–05–20.784	21–35–39.37	201–35–24.36	Lewen	3.1425880	1388.63	4555.9
PALM						
42–21–31.984	355–36–36.18	175–36–38.62	Brihy	3.0347173	1083.22	3553.9
71–08–51.413	45–28–29.46	225–27–25.47	Water	3.4842591	3049.71	10005.6

GEOGRAPHIC POSITIONS — Continued

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

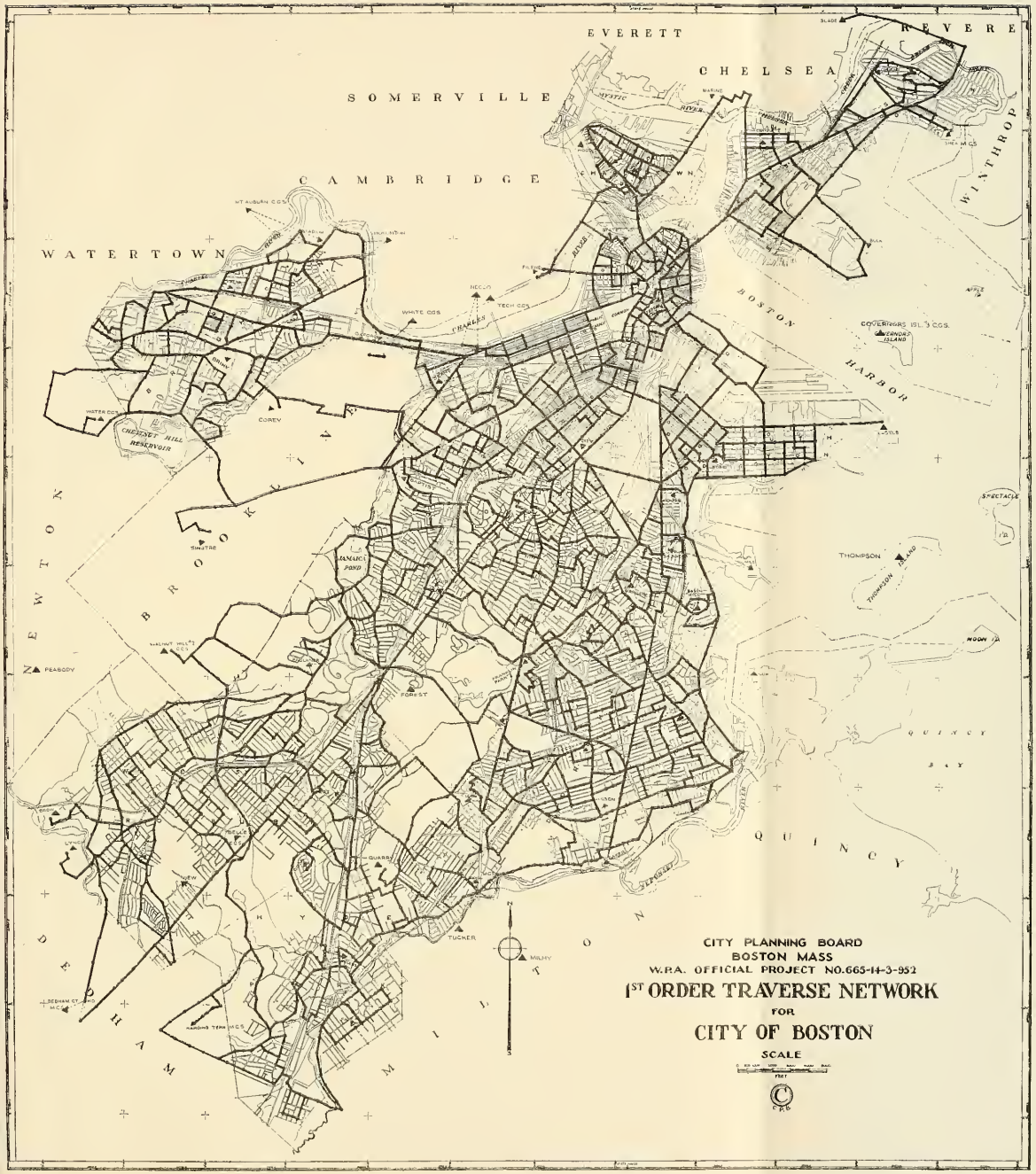
STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
PEABODY						
42–18–08.114	264–11–38.87	84–12–53.63	Walnut Hill 2	3.4077951	2557.38	8390.3
71–11–13.798	26–16–37.28	206–15–56.08	Need	3.5010018	3169.58	10398.9
	78–39–00.73	258–38–17.98	Work	3.1714234	1483.96	4868.6
POPE						
42–24–25.477	325–31–43.88	145–32–19.11	Orient	3.3246276	2111.68	6928.1
71–01–32.847	30–52–49.72	210–52–37.78	Powderhorn4	3.8969884	788.84	2588.1
POWDERHORN 4						
42–24–03.535	303–36–59.56	123–37–46.73	Orient	3.2836328	1921.47	6304.0
71–01–50.550	9–27–38.13	189–27–27.11	Ebhig 2	3.3571140	2275.69	7466.2
	42–22–32.31	222–21–56.51	Marine	3.2557534	1801.99	5912.0
QUARRY						
42–16–14.171	145–54–18.43	325–53–53.87	Heart	3.1738813	1492.39	4896.3
71–06–46.592	29–31–32.25	209–31–09.45	Rogers	3.1978854	1577.19	5174.5
ROGERS						
42–15–29.691	340–32–02.74	160–32–14.45	Fair	3.0784520	1197.99	3930.4
71–07–20.862	112–14–58.17	292–13–43.25	View	3.4407138	2758.76	9051.0
ROSE						
42–16–14.653	338–08–20.34	158–08–36.67	Rogers	3.1745740	1494.77	4904.1
71–07–45.144						
ST. MARGARET						
42–18–51.362	53–26–03.99	233–25–13.11	Franklin Pk.2	3.3335988	2155.75	7072.7
71–03–52.010	87–51–43.66	267–50–13.28	Dunn	3.4880692	3076.59	10093.8
	115–01–50.35	295–00–03.39	Baptist	3.6035848	4014.07	13169.5
	136–03–39.11	316–02–04.60	Sears	3.6655676	4629.86	15189.8
SEARS						
42–20–39.387	14–31–20.13	194–31–07.66	Baptist	3.2278016	1689.67	5543.5
71–06–12.359	118–32–55.89	298–31–46.59	Lincam	3.4281188	2679.90	8792.3
	128–02–10.42	308–01–40.25	Oxford	3.1143849	1301.32	4269.4
	160–47–37.01	340–47–11.70	Houghton	3.4171923	2613.32	8573.9
SHEA						
42–22–56.686	33–54–50.67	213–54–13.60	Bulk	3.3533905	2256.27	7402.4
70–59–45.178	86–34–50.70	266–33–21.25	Ebhig 2	3.4831182	3041.71	9979.3
SINGTRE						
42–19–27.451	133–28–25.70	313–27–32.83	Water	3.3938328	2476.47	8124.9
71–09–07.887						
SKINNER						
42–19–08.367						
71–03–10.458						
SLADE						
42–24–08.670	2–02–43.86	182–02–42.58	Orient	3.0874879	1223.17	4013.0
71–00–38.685	84–30–02.72	264–29–14.26	Powd'rhorn 4	3.2177817	1651.13	5417.1
	112–43–27.26	292–42–50.74	Pope	3.1280033	1342.78	4405.4

GEOGRAPHIC POSITIONS — Concluded

BASED ON UNITED STATES COAST AND GEODETIC SURVEY ADJUSTMENT

STATION LATITUDE AND LONGITUDE	Azimuth	Back Azimuth	To Station	Distance		
				Log. M.	Meters	Feet
SOBIG						
42–19–58.041	296–22–22.82	116–23–51.39	Thompson	3.5266090	3362.09	11030.5
71–02–42.304	344–31–20.59	164–31–35.35	Mile	3.2745041	1881.50	6172.9
	22–48–49.32	202–48–30.36	Skinner	3.2208205	1662.73	5455.1
	37–48–39.07	217–47–52.13	St. Margaret	3.4156295	2603.93	8543.1
	50–10–55.85	230–10–35.63	House	2.9517908	894.93	2936.1
	95–54–49.22	275–53–38.64	City	3.3823939	2412.09	7913.7
	136–30–55.44	316–29–26.80	Filene	3.6410457	4375.68	14355.9
STADIUM						
42–21–56.884	16–36–00.08	196–35–50.33	Lincam	3.0641449	1159.16	3803.0
71–07–40.749	64–35–36.66	244–34–49.05	Palm	3.2529243	1790.29	5873.6
	106–59–02.20	286–58–22.00	Mt. Auburn	3.1545286	1427.34	4682.9
STATE						
42–22–00.071	64–46–53.99	244–46–17.04	Filene	3.1420949	1387.06	4550.7
71–03–59.052	161–46–59.17	341–46–43.97	Hood	3.2175424	1650.22	5414.1
THOMPSON						
42–19–09.617	82–45–51.15	262–44–37.35	Mile	3.4031811	2530.35	8301.7
71–00–30.765						
TUCKER						
42–15–38.432	83–10–27.12	263–09–21.11	Rogers	3.3552916	2266.17	7434.9
71–05–42.696	126–49–53.41	306–49–10.19	Quarry	3.2647630	1839.77	6036.0
VIEW						
42–16–03.530	97–48–37.90	277–47–26.31	Lynch	3.3912863	2461.99	8077.4
71–09–12.274	119–26–43.08	299–26–19.57	Kilmer	2.9637465	919.91	3018.1
WALNUT HILL 2						
42–18–16.483	159–28–30.60	339–27–47.73	Water	3.6188233	4157.41	13639.8
71–09–22.718	188–48–54.88	08–49–04.87	Singtre	3.3455498	2215.90	7270.0
WATER						
42–20–22.665						
71–10–26.393						
WILSON						
42–16–52.153	355–43–02.22	175–43–04.63	Baker	3.0407955	1098.49	3604.0
71–04–12.178	23–24–33.37	203–24–00.81	Milhy	3.4459886	2792.47	9161.6
WORK						
42–17–58.644	358–49–33.22	178–49–34.76	Need	3.4066308	2550.53	8367.9
71–12–17.315						

STANDARDIZING TAPES


EVERETT
CHELSEA
REVERE
SOMERVILLE
CAMBRIDGE
WINTHROP
WATERTOWN
NEWTON
BROOKLINE
BOSTON HARBOR
QUINCY
MILTON
DEDHAM
THOMPSON ISLAND
SPECTACLE ISL.
GOVERNORS ISL.
CASTLE ISL.
LONG ISL.
PEDDOCKS ISL.
MOON ISL.
QUINCY BAY
MYSTIC RIVER
CHARLES RIVER
NEPONSET RIVER
WHITE CGS.
TECH CGS.
WATER CGS.
COREY
CHESTNUT HILL RESERVOIR
SIMONDS
JAMAICA POND
WALNUT HILLS
PEABODY
FOREST
QUARRY
TUCKER
MILHY
WT. AUBURN CGS.
NEEDHAM CGS.
READING TERR. HGS.
SHEA HGS.
SLADE
CITY PLANNING BOARD
BOSTON MASS
W.P.A. OFFICIAL PROJECT NO. 665-14-3-952
1ST ORDER TRAVERSE NETWORK
FOR
CITY OF BOSTON
SCALE
FEET
C.P.B.

APPENDIX

June 30, 1941

DISTRIBUTION OF LABOR COSTS OF WORK PROJECTS ADMINISTRATION PERSONNEL

	PHASE	1936	1937	1938	1939	1940	1941	TOTAL
A	**Triangulation**							
A1	Transportation		$3,133.28	$4,218.89				$7,352.17
A2	Reconnaissance	$122.44	2,418.93	1,385.64				3,927.01
A3	Set Monuments		124.04	1,414.13	$18.91			1,557.08
A4	Preparation	187.56	2,933.40	4,437.57	22.58			7,581.11
A5	Set Signals		212.99	1,786.11				1,999.10
A6	Observing	125.17	2,289.62	6,000.14	141.23			8,556.16
A7	Trans. Triangles		2,083.10	5,697.62	342.05			8,122.77
A8	Base Measurement		567.85	1,879.48	27.35	$116.04		3,637.72
A9	Computation		165.92	6,178.97	4,083.44	3,235.72	$623.06	14,287.11
A10	Supervision	157.93	4,001.01	4,503.03	1,482.79	1,028.31	411.00	11,584.07
A11	General	73.60	4,783.09	9,961.32	1,096.99	19.35		15,934.35
	Total	$666.70	$22,713.23	$47,462.90	$7,215.34	$5,446.42	$1,034.06	$84,538.65
B	**First Order Traverse**							
B1	Transportation			$411.74	$1,655.35			$2,067.09
B2	Reconnaissance			5,502.30	3,618.69			9,120.99
B3	Set Monuments			1,565.41	3,616.74			5,182.15
B4	Taping			2,517.77	8,741.51	$3,038.03	$817.37	15,144.68
B5	Ang. Meas.			1,896.08	1,229.92	6,175.38	1,509.68	21,873.06
B9	Computation			66.08	9,593.29	21,565.89	5,731.75	36,957.01
B10	Supervision			2,073.10	3,216.75	2,719.00	707.46	8,716.31
B11	General			4,333.61	6,583.58	5,873.57	1,120.31	17,911.07
	Total			$18,366.09	$49,317.83	$39,317.87	$9,886.57	$116,942.36

DISTRIBUTION OF LABOR COSTS OF WORK PROJECTS ADMINISTRATION PERSONNEL — Continued

	Phase	1936	1937	1938	1939	1940	1941	Total
C	**Supplementary Traverse**							
C1	Transportation					$36.60		$36.60
C2	Reconnaissance				$506.09	4,589.90		5,095.99
C3	Monuments							
C4	Taping					1,259.71	$2,571.00	3,830.71
C5	Ang. Meas.					3,796.22	7,806.39	11,602.61
C6	Tie-Ins					88.02		88.02
C9	Computations				23.46	5,923.10	1,949.89	7,896.45
C10	Supervision				97.54	1,496.18	1,459.61	3,053.33
C11	General				1,136.89	6,819.89	12,653.81	20,610.59
	Total				$1,763.98	$24,009.62	$26,440.70	$52,214.30
D	**First Order Levels**							
D1	Transportation				$282.30			$282.30
D2	Reconnaissance				1,523.00	$192.42		1,715.42
D3	Set. Bch. Mrks.							
D4	Field Work				1,601.56			1,601.56
D9	Computation				1,988.77			1,988.77
D10	Supervision				773.09	34.61		807.70
D11	General				480.16			480.16
	Total				$6,648.88	$227.03		$6,875.91
F	**Street Traverse**							
F4	Taping		$3,939.81	$791.26				$4,731.07
F5	Ang. Meas.		6,446.15	2,426.89	$64.28			8,937.32
F9	Computation		15,397.82	27,516.54	6,180.52			49,094.88
F10	Supervision		2,014.21	1,610.83	658.75			4,283.79
F11	General		5,331.91	8,398.57	311.22			13,941.70
	Total		$33,129.90	$40,644.09	$7,214.77			$80,988.76

DISTRIBUTION OF LABOR COSTS OF WORK PROJECTS ADMINISTRATION PERSONNEL — Continued

	PHASE	1936	1937	1938	1939	1940	1941	TOTAL
G	**Location**							
G4	Other Trav	$35,468.95	$14,808.00	$706.96	$22.60			$51,006.51
G5	St. Line Resch	9,568.87	8,845.81	11,666.29	9,615.03	$4,244.49		43,940.49
G6	Line and Mark	37,332.70	42,323.08	20,886.32	26,703.86	9,519.75		136,765.71
G7	Block Detail	4,912.73	15,318.03	8,480.75		15,550.22	$915.49	45,177.22
G9	Comp. Other Trav	3,199.62	2,652.64					5,852.26
G10	Supervision	5,039.40	6,060.18	2,891.59	2,601.29	1,667.81	172.26	18,432.53
G11	General	10,394.47	20,683.42	14,636.35	5,251.51	7,459.29	2,171.72	60,596.76
	Total	$10,596.74	$110,691.16	$59,268.26	$44,194.29	$38,441.56	$3,259.47	$361,771.48
H	**Final Plotting**							
H1	St. Lines		$1,410.10	$1,624.22	$327.93	$27.37		$3,389.62
H2	Block Detail	$1,640.32	2,850.66	4,021.50	371.80			8,884.28
H3	Lot Lines		430.21	958.96	61.89			1,451.06
H4	Other Trav	2,064.15	2,843.42	2,302.80	247.48	11.00		7,468.85
H5	Misc. Drafting	2,766.22	3,463.42	1,562.69		464.96		8,257.29
H6	Tracing		806.20	623.58	232.24	2,167.74	$72.00	3,901.76
H10	Supervision	2,265.00	1,579.69	1,618.35	1,652.87	399.61		7,515.52
H11	General		2,620.90	5,928.05	902.19	213.97		9,665.11
	Total	$8,735.69	$16,004.60	$18,640.15	$3,796.40	$3,304.65	$72.00	$50,533.49
M	**General Office**							
M1	General Off				$1,498.18	$1,940.72	$36.00	$3,474.90
M2	Work on Other Projects				637.58	78.95	196.00	912.53
M3	Other General				1,979.95	3,140.42		5,120.37
M10	Supervision				2,593.08	2,116.93	605.60	5,315.61
M11	General				19,650.28	23,446.74	9,369.30	52,467.32
	Total				$26,359.07	$30,723.76	$10,206.90	$67,290.73

DISTRIBUTION OF LABOR COSTS OF WORK PROJECTS ADMINISTRATION PERSONNEL — Concluded

	Phase	1936	1937	1938	1939	1940	1941	Total
T	**Circuit Control Traverse**							
T4	Taping	$7,291.27	$2,786.18					$10,077.45
T5	Ang. Meas	14,583.34	534.22					15,117.56
T6	Drafting	408.07	857.68					1,265.75
T9	Computation	17,120.20	14,251.95					31,372.15
T10	Supervision	2,949.95	98.97					3,048.92
T11	General	5,256.89	3,619.37					8,876.26
	Total	$47,609.72	$22,148.37					$69,758.09
U	**Cubage**							
U1	Bldg. Meas	$153,748.81	$6,061.95					$159,810.76
U2	Field Elev	25,964.58						25,964.58
U3	Vol. Comp	12,543.55	1,758.10					14,301.65
U8	Ck'g and Drft'g	34,220.02						34,220.02
U10	Supervision	6,330.63	2,159.72					8,490.35
U11	General	28,896.31	2,300.01					31,196.32
	Total	$261,703.90	$12,279.78					$273,983.68
V	**Misc. Suspended Survey**							
V1	Block Trav	$17,961.57	$786.17					$18,747.74
V9	Comp. Iner. Sta	6,223.44	62.24					6,285.68
V10	Supervision	1,524.84						1,524.84
V11	General	3,191.13	177.25					3,368.38
	Total	$28,900.98	$1,025.66					$29,926.64
W	**Installation — Heat**		$2,589.79					$2,589.79
X	**Installation — Elec**		4,393.22					4,393.22
	Grand Total	$453,533.73	$224,976.71	$184,381.49	$146,510.56	$141,524.91	$50,899.70	$1,201,827.70

REMARKS ON SPECIFICATION CONCERNING LENGTH CHECKS IN LEAST SQUARES ADJUSTMENT

The Specification. The specification reads as follows [see Manual No. 10 of the ASCE (Technical Procedure for City Surveys), 1934, p. 12]:

> "Where there are more than two base lines, the average discrepancy in length between adjacent bases after the adjustment of angle and side equations, shall not exceed 1:100,000, and the maximum discrepancy shall not exceed 1:75,000. Where there are only two base lines the length discrepancy shall not exceed 1:100,000."

Meaning and Significance of Specification. In order to apply this specification to an individual least squares adjustment correctly, it is first necessary to understand well the meaning and the significance of the specification. The meaning and significance of the specification is obviously this:

Suppose a length check between two adjacent bases is made *before* adjustment. The result will be, in general, a more or less considerable discrepancy. The base lines having been measured very accurately (namely 1:500,000 or even better), we will have to conclude that the cause of the length discrepancy lies in the so far not adjusted angles.

In other words, we might be justified to expect that, if the angle and side equations are adjusted *independently of the base lengths* and if the so adjusted angles are used in the length checks, the length discrepancies should disappear completely.

In practical conditions this ideal case will not occur. There will be always a length discrepancy between base lengths, even after the adjustment of the angles. In order to secure, however, a good adjustment, we can stipulate that the length discrepancy after the adjustment of the angles should not exceed a certain amount, and this is exactly the purpose and the meaning of the above specification.

It may occur that in some cases the length check will be worse after the angle adjustment than it was before (see Government Publication No. 138, p. 63); what we are concerned with, however, is *generally* the state of the net after angle adjustment, without regard to the original conditions. Speaking plainly, there is no sense in checking base lengths, measured very accurately, with the aid of angles, before the latter are corrected in themselves.

Application of Specification to Practical Cases. Starting from the above interpretation of the specification we are now able to apply it logically to an individual adjustment.

Where there are only two base lines and consequently one length equation, the practical application of the criterion is simple. The length equation is usually the last among the condition equations of the adjustment, and the specification is to be applied in the manner indicated in Government Publication No. 138, pp. 63 and 91. Whether the lengths are within the net or at the ends of the net (in the latter case we have the so called "arc") makes no difference in the application of the criterion: the specification in question requires, according to the above interpretation, that *all* of the angles of the net must be adjusted, not only those between the two bases considered.

If there are more than two bases in the net and consequently more than one length equation in the adjustment, we must proceed more cautiously.

Suppose, we have two length equations in the net. To illustrate the case, imagine the adjustment to be represented by tables 26–28 of Manual No. 10, pp. 50–52, and assume the length equations to be represented by equations 4 and 5 of that adjustment. The length check is first applied to equation 4 as indicated above. The question is now, how to apply it to equation 5.

According to the above reasoning we have to put equation 5 immediately after the angle and side equations and then to apply to it, in the manner indicated, the criterion.

To do this we have first to eliminate equation 4. Beginning with table 26, p. 50, we simply cross out the entire column headed by C4. Starting now from this modified table 26 and forming in the usual manner the normal equations, we will obtain, as easily seen, nothing else than the system represented by table 27, p. 51, if only the column headed by (4) is crossed out (the column headed by Σn changes, but we are not concerned with this column), and similarly the line 4 must be crossed out. This modified table 27 is to be used in working out the "solution of the normal equations". Applying again to the modified table 27 the well-known standard procedure we will arrive, as easily seen, at a modified table 28 which can be obtained from the original table 28 by crossing out in the latter the entire column headed by (4), and in the lines 1— q and v. This implies that the constant term in line w (this is the term which determines the discrepancy after angle adjustment) will be equal now to $+ 2.6772 + 0.0760 = 2.7532$, while it was before equal to + 2.6772. The (modified) constant + 2.7532 would then represent the length discrepancy of the length check considered, after adjustment of angles.

This example illustrates the application of the above specification in cases where there are more than two base lines.

Dividing The Correlate Equations by a Constant. (See Government Publication No. 138, p. 217.) The question arises whether or not the determining constant n is affected by the process of dividing some of the condition (or correlate) equations by a constant.

In the first place it is clear that the undivided constant (expressed in the units of the sixth decimal) of the length equation considered must be used in the length check. All angle and side equations can be divided by constants without affecting the final value of the determining constant n. We can see this as follows:

Take again the (original) table 26, p. 50 (Manual No. 10) and imagine all coefficients of column C_4 divided by 5. Then all numbers in column (4) and line 4 of table 27, p. 51, appear divided by 5, except the corner number + 263.2534, which appears divided by 25, giving + 10.5301. Consider now table 28, p. 52. All numbers in column (4), lines a-k, will appear divided by 5, the numbers of the same column (4), lines 1-p, appear divided by 25, the numbers of line p, columns (5), (n), (Σn), appear divided by 5, but the numbers of the same columns in the following line q appear *multiplied* by 5, therefore the products of lines p and q, as occurring in line v, do not undergo any changes as compared with the original values. In other words, the division of the angle equations does not affect the determining constant n.

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